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Maine Agricultural Experiment Station

BULLETIN No. 69. DECEMBER, 1900.

FINANCES, METEOROLOGY, INDEX.

This Bulletin contains the acknowledgment of gifts to the Station in 1900, the Report of the Treasurer, the summary of the meteorological observations, the index for the bulletins issued in 1900 and an index for the Reports for 1897 to 1900, inclusive. Bulletins 59 to 69 make up the Sixteenth Annual Report of the Station.

Requests for the Bulletins should be addressed to the
AGRICULTURAL EXPERIMENT STATION,
Orono, Maine.

MAINE

AGRICULTURAL EXPERIMENT STATION

ORONO, MAINE.

THE STATION COUNCIL.

President Abram W. Harris	*President*
Director Charles D. Woods	*Secretary*
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Charles S. Pope, Manchester	*State Pomological Society*
James M. Bartlett	*Members of the Station Staff*
Lucius H. Merrill	
Fremont L. Russell	
Welton M. Munson	
Gilbert M. Gowell	
Gilman A. Drew	

THE STATION STAFF.

The President of the University.

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James M. Bartlett	*Chemist*
Lucius H. Merrill	*Chemist*
Fremont L. Russell	*Veterinarian*
Welton M. Munson	*Horticulturist*
Gilbert M. Gowell	*Stock Breeding and Poultry*
Gilman A. Drew	*Zoologist*
Lucius J. Shepard	*Assistant in Agriculture*
Ora W. Knight	*Assistant Chemist*
Edward R. Mansfield	*Assistant Chemist*
Clifford D. Holley	*Assistant Chemist*
Perley Spaulding	*Assistant in Horticulture*

ACKNOWLEDGMENTS.

Acknowledgment is hereby made for the following gifts to the Station during 1900:

Chinese Artichokes, Artichokes from Italy, Seed Wheat, Seeds from Japan and Italy, Lawn Grass Seed from France—United States Department of Agriculture.

Carnations, Rooted Cuttings—Albert M. Herr, Lancaster, Pa.

Sulphate, Carbonate and Muriate of Potash and Kainit—German Kali Works, New York City.

Nitrate of Soda—Propaganda for Use of Nitrate of Soda, New York City.

Seed Potatoes—George W. P. Jerrard Company, Caribou.

Garden and Acme Corn Planters—Potato Implement Co., Traverse City, Mich.

Seat Spring for Farm Wagons—Cramer & Co., Bradley, Mich.

The following newspapers and other publications are kindly donated to the Station by the publishers:

Agricultural Epitomist, Indianapolis, Ind.
Agricultural Gazette, Sidney, New South Wales.
American Cultivator, Boston, Mass.
American Fertilizer, Philadelphia, Pa.
American Gardening, New York City.
American Grange Bulletin, Cincinnati, O.
American Grocer, New York City.
American Miller, Chicago, Ill.
Baltimore Weekly Sun, Baltimore, Md.
Bangor Weekly Commercial, Bangor, Me.
Beet Sugar Gazette, Chicago, Ill.
Breeders' Journal, Himrods, N. Y.
Canadian Horticulturist, Grimsby, Ont.
Chronique Agricole, Lausanne, Switzerland.

Country Gentleman, Albany, N. Y.
Dairy World, Chicago, Ill.
Detroit Free Press, Detroit, Mich.
Elgin Dairy Report, Elgin, Ill.
Farmer's Advocate, London, Ont.
Farmer's Guide, Huntington, Ind.
Farmer's Home, Dayton, O.
Farmer's Tribune, Des Moines, Iowa.
Farm Home, Springfield, Ill.
Farm and Home, Chicago, Ill.
Farm Journal, Philadelphia, Pa.
Farm-Poultry, Boston, Mass.
Farmer's Magazine, Springfield, Ill.
Farmer's Review, Chicago, Ill.
Farmer's Voice, Chicago, Ill.
Farming, Dayton, O.
Florists Exchange, New York City.
Florists Review, Chicago, Ill.
Forester, Princeton, N. J.
Fruit, Dunkirk, N. Y.
Golden Egg, St. Louis, Mo.
Green's Fruit Grower, Rochester, N. Y.
Hoard's Dairyman, Ft. Atkinson, Wis.
Holstein Friesian Register, Brattleboro, Vt.
Homestead, Des Moines, Iowa.
Horticultural Visitor, Kinmundy, Ill.
Inland Poultry Journal, Indianapolis, Ind.
Jersey Bulletin, Indianapolis, Ind.
Journal of the Royal Agricultural Society, London, England.
Louisiana Planter, New Orleans, La.
Lewiston Weekly Journal, Lewiston, Maine.
Maine Farmer, Augusta, Maine.
Mark Lane's Express, London, England.
Market Garden, Minneapolis, Minn.
Massachusetts Ploughman, Boston, Mass.
Mirror & Farmer, Manchester, N. H.
Modern Miller, St. Louis, Mo.
Montana Fruit Grower, Missoula, Mont.
National Farmer and Stock Grower, National Stock Yards, Ill.

National Rural and Family Magazine, Chicago, Ill.
National Stockman and Farmer, Pittsburg, Pa.
New England Farmer, Boston, Mass.
New England Florist, Boston, Mass.
New England Homestead, Springfield, Mass.
New York Farmer, Port Jervis, N. Y.
New York Produce Review, New York City.
North American Horticulturist, Monroe, Mich.
Northern Leader, Fort Fairfield, Me.
Northwestern Miller, Minneapolis, Minn.
Oregon Agriculturist, Portland, Oregon.
Pacific Coast Dairyman, Tacoma, Wash.
Park and Cemetery, Chicago, Ill.
Practical Dairyman, Spencer, Ind.
Practical Farmer, Philadelphia, Pa.
Practical Industry, Gouverneur, N. Y.
Public Ledger, Philadelphia, Pa.
Ruralist, Gluckheim, Md.
Rural Californian, Los Angeles, Cal.
Rural New Yorker, New York City.
Rural Topics, Morgan City, La.
Southern Farm Magazine, Baltimore, Md.
Southern Farmer, New Orleans, La.
Southern Planter, Richmond, Va.
Southwest, Springfield, Mo.
Southwestern Farmer, Wichita, Kans.
Strawberry Specialist, Kittrell, N. C.
Sugar Beet, Philadelphia, Pa.
Turf, Farm and Home, Waterville, Me.
Vick's Magazine, Rochester, N. Y.
Weekly Union, Manchester, N. H.
Western Agriculturist, Chicago, Ill.
Western Creamery, San Francisco, Cal.
Western Fruit Grower, St. Joseph, Mo.
The World, Vancouver, B. C.

METEOROLOGICAL OBSERVATIONS.

The instruments used at this Station are the same as those used in preceding years, and include: Wet and dry bulb thermometers; maximum and minimum thermometers; thermograph; rain-gauge; self-recording anemometer; vane; and barometer. The observations at Orono now form an almost unbroken record of thirty-one years.

The mean temperature for 1900 was about one degree above the average for 32 years. The greatest monthly variations from the average were in April and October, which were 3°.74 and 5°.55 respectively higher than usual. The total precipitation, 53.8 inches, was higher than that recorded at any one year at this Station since 1870, when the fall was 58.04 inches. The rainfall was very unequally distributed through the year, April being dry, while in May the fall was more than double the average, thus greatly delaying planting. July and August were so dry that crops in this section suffered greatly. Latitude, 44°, 54′, 2″ N. Longitude 68°, 40′, 11″ W. Elevation above the sea, 150 feet.

METEOROLOGICAL SUMMARY FOR 1900.

Observations Made at the Maine Experiment Station.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Mean.	Total.
Highest barometer	30.52	30.49	30.31	30.24	30.12	30.09	29.99	30.05	30.21	30.38	30.33	30.28	30.24	......
Lowest barometer	28.81	28.55	29.16	29.20	29.33	29.37	29.28	29.48	28.90	29.36	28.84	29.19	29.12	.....
Mean barometer	29.74	29.77	29.71	29.73	29.74	29.72	29.73	29.83	29.85	29.98	29.82	29.81	29.79	......
Highest temperature	46°	50°	52°	78°	83°	86°	89°	94°	93°	76°	72°	45°	....	......
Lowest temperature	—19°	—21°	—10°	21°	26°	38°	47°	43°	27°	19°	9°	—16°	....	......
Mean temperature	17°.82	20°.49	26°.58	44°.12	49°.49	63°.39	68°.10	66°.30	59°.37	51°.55	35°.90	18°.65	43°.46	......
Mean temperature for 32 years	16°.04	19°.28	27°.53	40°.38	52°.29	62°.03	67°.01	65°.10	60°.22	46°.00	34°.26	20°.31	42°.54	......
Total precipitation in inches	8.14	6.75	5.47	2.01	8.24	3.83	2.53	1.58	2.94	5.70	4.59	2.02	....	53.80
Mean precipitation for 32 years	4.37	4.15	4.24	2.82	3.64	3.62	3.33	3.57	3.35	4.07	4.44	3.73	....	45.33
No. of days with precip. of .01 in. or more	10	10	5	7	13	7	9	10	7	8	11	6	....	103
Snow fall in inches	26.30	23.00	16.50	....	....	......	....	....	... ...	....	7.75	11.75	....	85.30
Average snow fall for 32 years	23.20	21.80	17.10	5.80	....	. ...	....	....	....	0.93	7.80	16 80	....	93.43
Number of clear days	14	10	12	10	9	14	9	11	15	11	7	11	....	133
Number of fair days	4	2	8	5	8	5	11	9	6	8	7	4	....	77
Number of cloudy days	13	16	11	15	14	11	11	11	9	12	16	16	....	153
Total movement of wind in miles	5844	6920	8308	7137	6137	5063	5131	4665	4569	5452	6624	4549	.... ..	......

REPORT OF THE TREASURER.

Maine Agricultural Experiment Station in account with the United States appropriation, 1899-1900.

Dr.

To receipts from the Treasurer of the United States as per appropriation for the fiscal year ending June 30, 1900, as per act of Congress approved March 2, 1887		$15,000 00

Cr.

By salaries:		
(a) Director and administration officers	$2,360 91	
(b) Scientific staff	3,666 68	
(c) Assistants to scientific staff	1,730 28	
(d) Special and temporary services	55 06	
Total		$7,812 93
Labor:		
(a) Monthly employees	$755 00	
(b) Daily employees	713 23	
Total		1,468 23
Publications		26 65
Postage and stationery		326 29
Freight and express		187 16
Heat, light and water		1,064 41
Chemical supplies:		
(a) Chemicals	$308 37	
(b) Other supplies	68 89	
Total		377 26
Seeds, plants and sundry supplies:		
(a) Agricultural	$66 95	
(b) Horticultural	160 52	
(e) Miscellaneous	418 93	
Total		646 40
Fertilizers		171 73
Feeding stuffs		1,107 02
Library		243 34
Tools, implements, and machinery		190 78
Furniture and fixtures		262 01
Scientific apparatus		58 37

Maine Agricultural Experiment Station in account with Creamery Inspection for the year ending December 31, 1900.

Dr.	
To fees for calibrating glassware	$53 34
Cr.	
By expense calibrating glassware	$53 34

Maine Agricultural Experiment Station in account with "General Account" for the year ending June 30, 1900.

Dr.		
To balance from 1898-9	$1,305 29	
Sales of produce, etc	3,857 20	$5,162 49
Cr.		
By salaries	$306 33	
Labor	1,397 66	
Stationery	8 04	
Heat, light and water	22 00	
Seeds, plants, and sundry supplies	1,009 70	
Feeding stuffs	41 93	
Tools, implements and machinery	2 70	
Furniture and fixtures	55 87	
Scientific apparatus	5 93	
Live stock	13 55	
Traveling expenses	11 75	
Contingent (chiefly insurance)	190 08	
Buildings and repairs	1,460 95	
Balance to 1900-1901 account	636 00	$5,162 49

Live stock:		
(a) Horses	$90 00	
(c) Sheep	18 00	
(e) Poultry	32 47	
(f) Sundries	211 77	
Total		$352 24
Traveling expenses:		
(a) In supervision of Station work	$162 12	
(b) In attending various meetings	135 40	
Total		297 52
Buildings and repairs:		
(a) New buildings		407 66
Total		$15,000 00

ISAIAH K. STETSON, *Treasurer.*

I, the undersigned. duly appointed Auditor of the Corporation, do hereby certify that I have examined the books of the Maine Agricultural Experiment Station for the fiscal year ending June 30, 1900, that I have found the same well kept and classified as above, and that the receipts for the year from the Treasurer of the United States are shown to have been $15,000.00, and the corresponding disbursements, $15,000.00; for all of which proper vouchers are on file and have been examined by me and found correct.

And I further certify that the expenditures have been solely for the purposes set forth in the act of Congress approved March 2, 1887.

A. W. HARRIS, *Auditor.*

Maine Agricultural Experiment Station in account with Fertilizer Inspection for the year ending December 31, 1900.

DR.

To balance from account of 1899	$253 69	
Receipts for licenses	2,555 00	$2,808 69

CR.

By collection and analyses of samples	$1,861 32	
Executive and office expenses	700 00	
Balance to account of 1901	247 37	$2,808 69

Maine Agricultural Experiment Station in account with Feed Inspection for the year ending December 31, 1900.

DR.

To receipts for inspection tags, 1900	$1,917 76	
Balance to account of 1900	666 53	$2,584 29

CR

By balance carried from 1899 account	$786 07	
Collection and analyses of samples	628 54	
Tags	469 68	
Executive and office expenses	700 00	
		$2,584 29

FIFTEENTH ANNUAL REPORT

OF THE

Maine Agricultural Experiment Station

ORONO, MAINE

1899.

Part II of the Annual Report of the University of Maine.

FIFTEENTH ANNUAL REPORT

OF THE

Maine Agricultural Experiment Station

ORONO MAINE

PART II OF THE ANNUAL REPORT OF THE UNIVERSITY OF MAINE

AUGUSTA
KENNEBEC JOURNAL PRINT
1900

The Bulletins of this Station will be sent free to any address in Maine. All requests should be sent to

Agricultural Experiment Station,
Orono, Maine.

STATE OF MAINE.

A. W. Harris, Sc. D., President of the University of Maine:

SIR:—I transmit herewith the Fifteenth Annual Report of the Maine Agricultural Experiment Station for the year ending December 31, 1899.

CHARLES D. WOODS,
Director.

ORONO, Maine, December 31, 1899.

MAINE
AGRICULTURAL EXPERIMENT STATION
ORONO, MAINE.

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Lucius J. Shepard	*Assistant in Agriculture*
Ora W. Knight	*Assistant Chemist*
Horace L. White *	*Assistant Chemist*
Edward R. Mansfield †	*Assistant Chemist*

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* Resigned June 30, 1899.

† Appointed July 1, 1899.

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ANNOUNCEMENTS.

THE AIM OF THE STATION.

Every citizen of Maine concerned in Agriculture, has the right to apply to the Station for any assistance that comes within its province. It is the wish of the Trustees and Station Council that the Station be as widely useful as its resources will permit.

In addition to its work of investigation, the Station is prepared to make chemical analyses of fertilizers, feeding stuffs, dairy products and other agricultural materials; to test seeds and creamery glass-ware; to identify grasses, weeds, injurious fungi and insects, etc.; and to give information on agricultural matters of interest and advantage to the citizens of the State.

All work proper to the Experiment Station and of public benefit will be done without charge. Work for the private use of individuals is charged for at the actual cost to the Station. The Station offers to do this work only as a matter of accommodation. Under no condition will the Station undertake analyses, the results of which cannot be published, if they prove of general interest.

INSPECTIONS.

The execution of the laws regulating the sale of commercial fertilizers, concentrated commercial feeding stuffs, and agricultural seeds, and the inspection of chemical glass-ware used by creameries is entrusted to the Director of the Station. The Station officers take pains to obtain for analysis samples of all brands of fertilizers and feeding stuffs coming under the law, but the organized co-operation of farmers is essential for the full and timely protection of their interests. Granges, Farmers Clubs and other organizations can render efficient aid by report-ing any attempt at evasion of the laws and by sending, early in the season, samples taken from stock *in the market* and drawn in accordance with the Station directions for sampling. In case there should be a number of samples of the same brand sent in, the Station reserves the right to analyze only in part.

STATION PUBLICATIONS.

The Station publishes 10 to 12 bulletins each year covering in detail its expenses, operations, investigations and results. The bulletins are mailed free to all citizens who request them. The annual Report is a reprint of the bulletins of the year and is bound with the Report of the Board of Agriculture and distributed by the Secretary of the Board. This combined report can be obtained by addressing the Secretary of Agriculture, State House, Augusta, Maine.

CORRESPONDENCE.

As far as practicable, letters are answered the day they are received. Letters sent to individual officers are liable to remain unanswered, in case the officer addressed is absent. All communications should, therefore, be addressed to the

Agricultural Experiment Station,
Orono, Maine.

The post office, railroad station, freight, express and telegraph address is Orono, Maine. Visitors to the Station can take the electric cars at Bangor and Old Town.

The telephone call is "Bangor, 27-3."

Directions, forms and labels for taking samples, of fertilizers, feeding stuffs and seeds for analysis can be had on application.

Parcels sent by express should be prepaid, and postage should be enclosed in private letters demanding a reply.

Remittances should be made payable to the undersigned.

CHAS. D. WOODS, *Director*

FEEDING STUFF INSPECTION.

Samples of the feeding stuffs coming under the inspection law were drawn by the inspectors in November, 1898. The results of the chemical analyses follow. A discussion of the results of some of the analyses will be found on pages 18 to 21.

The law is working very satisfactorily indeed. There are practically no goods sold which are not properly guaranteed. That the law is keeping out low grade goods is evidenced by the following from a letter received a few weeks since: "You will please print tags as ordered for x x x x x Mill and send same by freight instead of express. We have discovered that the meal we anticipated shipping into Maine market was not of sufficient quality to meet requirements of your State. We have, therefore, concluded not to ship as anticipated. We will, later in the season, have a very nice grade of meal at x x x x Mill at which time we will place same in Maine market."

FEEDS LOW IN PROTEIN.

Very few farmers can afford to buy feeds low in protein and high in carbohydrates at any price at which they have been or are likely to be offered. The farmer should grow all the coarse feeds that he needs. Oat and similar feeds are very much like corn stalks or oat straw in composition. Some of the feeds have cottonseed or other nitrogenous feeding stuffs added to them so that they carry more protein than straight oat feeds, but these mixtures are always more expensive sources of protein than are the glutens, cottonseed and linseed meals. One hundred pounds of an ordinary oat feed has from eight to eleven pounds protein. At seventy-five cents per hundred the protein costs from seven to nine cents a pound. One hundred pounds of a good gluten meal has from thirty-four to forty per cent of protein. At $1.10 per hundred the protein costs about three cents a pound and it not only costs less than half as much but it is better digested. As a source of protein, it would be as good economy to pay $60.00 a ton for high grade cottonseed meal as to pay $15.00 a ton for the ordinary oat feed.

MANUFACTURERS AND PLACE OF SAMPLING.

Station Number.	Manufacturer or Jobber.	Manufactured at	Sampled at
8278	American Cotton Oil Co	Huntsville, Ala	Pittsfield
8282	American Cotton Oil Co	Huntsville, Ala	Bowdoinham
8338	American Cotton Oil Co	Huntsville, Ala	East Sumner
8279	American Cotton Oil Co	Pine Bluff, Ark	Pittsfield
8280	American Cotton Oil Co	Little Rock, Ark	Dexter
8283	American Cotton Oil Co	Brinkley, Ark	Newport
8281	American Cotton Oil Co	Memphis, Tenn	Belfast
8284	American Cotton Oil Co	Jackson, Tenn	Belfast
8285	American Cotton Oil Co	Jackson, Tenn	Rockland
8337	American Cotton Oil Co	Jackson, Tenn	Dixfield
8339	American Cotton Oil Co	Nashville, Tenn	East Sumner
8380	American Cotton Oil Co	Nashville, Tenn	Monmouth
8389	American Cotton Oil Co	Nashville, Tenn	Auburn
8349	American Cotton Oil Co		Buxton Center
8286	The Southern Cotton Oil Co	Little Rock, Ark	Bath
8289	J. E. Soper & Co		Newport
8381	J. E. Soper & Co		Augusta
8293	R. B. Brown Oil Co		Dexter.
8294	R. B. Brown Oil Co		Corinna
8295	S. W. Thaxter & Co	Benham, Texas	Bucksport.
8296	S. W. Thaxter & Co	Benham, Texas	Orrington
8297	S. W. Thaxter & Co	Benham, Texas	Thomaston
8287	S. W. Thaxter & Co	Benham, Texas	Winterport
8290	F. W. Brodé & Co	Memphis, Tenn	Brunswick
8291	F. W. Brodé & Co	Memphis, Tenn	Dexter
8292	F. W. Brodé & Co	Memphis, Tenn	Foxcroft
8340	F. W. Brodé & Co	Memphis, Tenn	W. Minot
8341	F. W. Brodé & Co	Memphis, Tenn	Canton
8350	F. W. Brodé & Co.	Memphis, Tenn	Buxton Center
8364	F. W. Brodé & Co	Memphis, Tenn	Bridgton
8382	F. W. Brodé & Co	Memphis, Tenn	Monmouth
8390	F. W. Brodé & Co	Memphis, Tenn	Lewiston
8402	F. W. Brodé & Co	Memphis, Tenn	Houlton
8288	I. A. Barstow		Bangor
8391	C. S. O. Co		Farmington
8308	Chas. Pope Glucose Co	Chicago, Ill	Camden
8309	Chas. Pope Glucose Co	Chicago, Ill	Orrington
8310	Chas. Pope Glucose Co	Chicago, Ill	Brunswick
8345	Chas. Pope Glucose Co	Chicago, Ill	South Paris
8353	Chas. Pope Glucose Co	Chicago, Ill	Saco
8367	Chas. Pope Glucose Co	Chicago, Ill	Portland
8395	Chas. Pope Glucose Co	Chicago, Ill	Lewiston
8298	The Glucose Sugar Refining Co.		Thomaston
8299	The Glucose Sugar Refining Co.		Brunswick
8300	The Glucose Sugar Refining Co.		Bucksport
8301	The Glucose Sugar Refining Co.		Bangor
8302	The Glucose Sugar Refining Co.		Belfast
8303	The Glucose Sugar Refining Co.		Winterport

ANALYSES OF SAMPLES.

Name of feed.	Moisture—per cent.	Protein.		Fat.		Station number.
		Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.	
Prime Cotton Seed Meal	7.55	42.25	43.00	11.48	9.00	8278
Prime Cotton Seed Meal	8.57	46.44	43.00	10.23	9.00	8282
Prime Cotton Seed Meal	8.36	43.94	43.00	9.77	9.00	8338
Prime Cotton Seed Meal	8.10	45.38	43.00	10.43	9.00	8279
Prime Cotton Seed Meal	8.30	45.50	43.00	9.43	9.00	8280
Prime Cotton Seed Meal	6.67	47.13	43.00	12.46	9.00	8283
Prime Cotton Seed Meal	7.98	42.25	43.00	13.32	9.00	8281
Prime Cotton Seed Meal	9.21	47.81	43.00	8.80	9.00	8284
Prime Cotton Seed Meal	8.90	47.00	43.00	10 78	9.00	8285
Prime Cotton Seed Meal	9.73	46.94	43.00	10.33	9.00	8337
Prime Cotton Seed Meal	8.48	46.69	43.00	10.31	9.00	8339
Prime Cotton Seed Meal	7.42	46.75	43.00	11.26	9.00	8380
Prime Cotton Seed Meal	7.71	46.00	43.00	11.47	9.00	8389
Prime Cotton Seed Meal	8.59	45.82	43.00	10.51	9.00	8349
Prime Cotton Seed Meal	8.46	46.82	43.00	9.76	9.00	8286
Cotton Seed Meal	8.40	46.13	43.00	8.78	9.00	8289
Cotton Seed Meal	6.27	44.75	43.00	14.72	9.00	8381
Prime Cotton Seed Meal	9.32	47.88	43.00	8.34	9.00	8293
Prime Cotton Seed Meal	8.20	46.75	43.00	9.97	9.00	8294
Cotton Seed Meal	8.33	48.69	49.25	11.25	15.62	8295
Cotton Seed Meal	8.54	50.06	49.25	10.87	15.62	8296
Cotton Seed Meal	7.70	51.26	49.25	10.33	15.62	8297
Cotton Seed Meal	7.46	51.92	49.25	10.71	15.62	8287
Owl Brand Cotton Seed Meal	8.46	44.50	43.00	11.38	9.00	8290
Owl Brand Cotton Seed Meal	7.84	44.63	43.00	10.63	9.00	8291
Owl Brand Cotton Seed Meal	7.50	45.32	43.00	11.50	9.00	8292
Owl Brand Cotton Seed Meal	8.20	46.38	43.00	9.90	9.00	8340
Owl Brand Cotton Seed Meal	7.24	43.31	43.00	13.13	9.00	8341
Owl Brand Cotton Seed Meal	8.30	43.31	43.00	12.08	9.00	8350
Owl Brand Cotton Seed Meal	7.52	45.13	43.00	12.41	9.00	8364
Owl Brand Cotton Seed Meal	8.09	44.75	43.00	12.49	9.00	8382
Owl Brand Cotton Seed Meal	7.30	44.50	43.00	12.59	9.00	8390
Owl Brand Cotton Seed Meal	9.28	45.00	43.00	12.87	9.00	8402
Sea Island Cotton Seed Meal	10.73	21.82	20.13	5.83	4.57	8288
Sea Island Cotton Seed Meal	10.98	25.06	24.31	7.09	5.00	8391
Cream Gluten Meal	9.79	30.94	37.12	3.38	3.20	8308
Cream Gluten Meal	8.92	33.50	37 12	5.43	3.20	8309
Cream Gluten Meal	9.48	34.88	37.12	2.24	3.20	8310
Cream Gluten Meal	10.04	33.81	37.12	3.49	3.20	8345
Cream Gluten Meal	8.48	35.69	37.12	2.73	3.20	8353
Cream Gluten Meal	9.27	32.56	37.12	4.32	3.20	8367
Cream Gluten Meal	9.35	31.19	37.12	3.13	3.20	8395
Chicago Gluten Meal	10.56	37.13	37.50	2.59	9.00	8298
Chicago Gluten Meal	11.02	39.63	37.50	1.94	9.00	8299
Chicago Gluten Meal	11.15	36.13	36.00	2.49	3.37	8300
Chicago Gluten Meal	10.76	38.82	38.00	2.79	2.00	8301
Chicago Gluten Meal	10.52	38.63	38.00	2.01	2.00	8302
Chicago Gluten Meal	10.23	37.69	37.50	2.13	9.00	8303

MANUFACTURERS—Continued.

Station Number.	Manufacturer or Jobber.	Manufactured at	Sampled at
8304	The Glucose Sugar Refin. Co		Foxcroft
8342	The Glucose Sugar Refin. Co		Minot
8351	The Glucose Sugar Refin. Co		Buxton Center
8365	The Glucose Sugar Refin. Co		Bridgton
8375	The Glucose Sugar Refin. Co		Milltown
8376	The Glucose Sugar Refin. Co		Calais
8383	The Glucose Sugar Refin. Co		Waterville
8392	The Glucose Sugar Refin. Co		Lewiston
8305	National Starch Manf'g Co	Indianapolis, Ind.	Foxcroft
8306	National Starch Manf'g Co	Indianapolis, Ind.	Richmond
8343	National Starch Manf'g Co	Indianapolis, Ind.	Canton
8393	National Starch Manf'g Co	Indianapolis, Ind.	Lewiston
8394	National Starch Manf'g Co	Des Moines, Iowa	Farmington
8384	National Starch Manf'g Co	Des Moines, Iowa	Oakland
8344	National Starch Manf'g Co	Des Moines, Iowa	Dixfield
8307	National Starch Manf'g Co	Des Moines, Iowa	Dexter
8352	National Starch Manf'g Co	Des Moines, Iowa	Springvale
8358	National Starch Manf'g Co		North Yarmouth
8366	National Starch Manf'g Co		Gorham
8311	Arthur R. Hopkins	Bangor	Bangor
8312	American Glucose Co		Dexter
8327	S. W. Thaxter & Co		Bath
8346	The Glucose Sugar Refin. Co		West Paris
8354	The Glucose Sugar Refin. Co		Berwick
8377	The Glucose Sugar Refin. Co		Calais
8396	The Glucose Sugar Refin. Co		Auburn
8328	Douglas & Co		Brunswick
8329	The Cleveland Linseed Oil Co		Rockland
8330	The Cleveland Linseed Oil Co		Belfast
8313	The American Cereal Co		Bucksport
8314	The American Cereal Co		Brunswick
8316	The American Cereal Co		Rockland
8317	The American Cereal Co		Foxcroft
8347	The American Cereal Co		West Paris
8357	The American Cereal Co		Waterboro
8369	The American Cereal Co		Fryeburg
8378	The American Cereal Co		Eastport
8385	The American Cereal Co		Showhegan
8397	The American Cereal Co		Auburn
8403	The American Cereal Co		Houlton
8315	S. A. & J. H. True		Brunswick
8318	The American Cereal Co		Newport
8319	The American Cereal Co		Brunswick
8320	The American Cereal Co		Rockland
8321	The American Cereal Co		Foxcroft
8348	The American Cereal Co		West Paris
8356	The American Cereal Co		Waterboro
8368	The American Cereal Co		South Windham

ANALYSES—CONTINUED.

Name of Feed.	Moisture—per cent.	Protein.		Fat.		Station number.
		Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.	
Chicago Gluten Meal	10.47	40.63	37.50	1.70	9.00	8304
Chicago Gluten Meal	11.58	36.88	36.00	1.98	3.37	8342
Chicago Gluten Meal	10.98	37.50	37.50	1.89	9.00	8351
Chicago Gluten Meal	11.28	39.69	38.00	1.92	2.00	8365
Chicago Gluten Meal	11.72	37.07	38.00	2.05	2.00	8375
Chicago Gluten Meal	11.37	36.88	37.50	2.20	9.00	8376
Chicago Gluten Meal	10.50	38.44	37.50	1.80	9.00	8383
Chicago Gluten Meal	10.52	37.50	37.50	2.61	9.00	8392
King Gluten Meal	9.44	34.06	32.00	4.28	15.00	8305
King Gluten Meal	6.69	37.32	32.00	5.06	16.00	8306
King Gluten Meal	9.34	34.69	32.00	4.30	16.00	8343
King Gluten Meal	7.91	35.75	32.00	6.87	16.00	8393
King Gluten Meal	7.04	32.44	32.00	15.57	16.00	8394
King Gluten Meal	6.04	33.13	32.00	15.54	16.00	8384
King Gluten Meal	7.87	31.50	34.26	13.24	14.65	8344
King Gluten Meal	6.34	32.82	32.00	15.41	16.00	8307
King Gluten Meal	8.28	32.81	32.00	16.40	16.00	8352
King Gluten Meal	8.20	33.25	32.00	16.30	16.00	8358
King Gluten Meal	7.07	32.06	32.00	15.90	16.00	8366
Imperial Gluten Meal	9.20	20.13	20.00	12.00	11.50	8311
Buffalo Gluten Feed	9.27	28.25	29.00	4.68	3.00	8312
Gluten Feed	10.26	22.63	*	5.93	*	8327
Rockford Diamond Gluten Feed	10.50	25.44	24.20	4.08	3.75	8346
Rockford Diamond Gluten Feed	9.44	25.44	24.20	3.44	3.75	8354
Rockford Diamond Gluten Feed	8.94	24.69	24.20	3.86	3.75	8377
Rockford Diamond Gluten Feed	7.34	25.75	24.20	4.43	3.75	8396
Old Process Oil Meal	9.00	26.63	36.94	6.45	6.58	8328
Cleveland Flax Meal	11.68	39.75	39.00	2.28	1.50	8329
Linseed Oil Meal	10.40	36.81	39.00	2.52	1.50	8330
Victor Corn and Oat Feed	9.52	9.56	9.46	4.31	3.92	8313
Victor Corn and Oat Feed	9.21	8.12	9.46	3.36	3.92	8314
Victor Corn and Oat Feed	9.31	9.94	9.46	4.44	3.92	8316
Victor Corn and Oat Feed	10.67	8.88	9.46	3.84	3.92	8317
Victor Corn and Oat Feed	10.20	9.06	9.46	3.18	3.92	8347
Victor Corn and Oat Feed	10.57	8.88	9.46	2.85	3.92	8357
Victor Corn and Oat Feed	8.90	9.69	9.46	4.92	3.92	8369
Victor Corn and Oat Feed	9.46	9.38	9.46	4.87	3.92	8378
Victor Corn and Oat Feed	8.54	8.75	9.46	3.53	3.92	8385
Victor Corn and Oat Feed	9.15	8.38	9.46	3.31	3.92	8397
Victor Corn and Oat Feed	11.25	9.02	9.46	3.57	3.92	8403
Corn and Oat Feed	9.80	8.38	9.63	3.44	4.23	8315
Quaker Oat Feed	8.94	9.44	12.03	2.57	3.49	8318
Quaker Oat Feed	8.36	10.31	12.03	3.61	3.49	8319
Quaker Oat Feed	8.32	11.13	12.03	3.57	3.49	8320
Quaker Oat Feed	7.48	7.44	12.03	2.98	3.49	8321
Quaker Oat Feed	8.27	10.31	12.03	3.29	3.49	8348
Quaker Oat Feed	9.51	10.38	12.03	2.87	3.49	8356
Quaker Oat Feed	7.95	10.88	12.03	3.79	3.49	8368

* Not guaranteed.

MANUFACTURERS—CONCLUDED.

Station number.	Manufacturer or Jobber.	Manufactured at	Sampled at
8399	The American Cereal Company		Lewiston
8322	The American Cereal Company		Brunswick
8323	The American Cereal Company		Richmond
8373	W. H. Haskell & Company		Portland
8398	Andrew Cullen & Company		Auburn
8400			Auburn
8324	The H-O Company	Buffalo	Bowdoinham
8372	The H-O Company	Buffalo	Freeport
8386	The H-O Company	Buffalo	Bangor
8325	The H-O Company	Buffalo	Richmond
8371	The H-O Company	Buffalo	Freeport
8388	The H-O Company	Buffalo	Bangor
8326	The H-O Company	Buffalo	Richmond
8370	The H-O Company	Buffalo	Freeport
8387	The H-O Company	Buffalo	Bangor
8331	E. W. Blatchford & Company		Brunswick
8332	The Bowker Fertilizer Co		Belfast
8333	The Bowker Fertilizer Co		Brunswick
8334	The Bowker Fertilizer Co		Camden
8355	The Bowker Fertilizer Co		Buxton Center
8374	The Bowker Fertilizer Co		Gorham
8335	Bradley Fertilizer Company		Belfast
8336	Bradley Fertilizer Company		Belfast

ANALYSES—CONCLUDED.

Name of Feed.	Moisture—per cent.	PROTEIN.		FAT.		Station number.
		Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.	
Quaker Oat Feed	7.77	10.75	12.03	3.97	3.49	8399
American Poultry Food	9.82	14.19	*	5.91	*	8322
Corn, Oat and Barley Feed	9.42	12.75	11.26	5.39	4.15	8323
Haskell's Oat Feed	9.13	11.31	9.62	7.91	7.66	8373
Crescent Oat Feed	7.42	8.63	*	3.72	*	8398
Monarch Oat Feed	8.78	11.19	10.25	8.79	7.47	8400
The H-O Co.'s Poultry Feed	10.26	17.81	16.80	5.43	7.00	8324
The H-O Co.'s Poultry Feed	9.43	18.00	16.80	5.76	7.00	8372
The H-O Co.'s Poultry Feed	9.50	18.31	16.80	5.92	7.00	8386
The H-O Co.'s Stand. Dairy Feed	8.19	20.38	18.75	5.42	7.25	8325
The H-O Co.'s Stand. Dairy Feed	8.30	20.94	18.75	5.39	7.25	8371
The H-O Co.'s Stand. Dairy Feed	8.52	17.06	18.75	4.24	7.25	8388
The H-O Co.'s Horse Feed	9.80	11.94	12.30	3.81	4.90	8326
The H-O Co.'s Horse Feed	10.91	11.81	12.30	4.51	4.90	8370
The H-O Co.'s Horse Feed	9.06	11.69	12.30	4.75	4.90	8387
Blatchford's Calf Meal	8.36	33.41	*	5.23	*	8331
Bowker's Animal Meal	5.64	41.07	30.00	14.05	5.00	8332
Bowker's Animal Meal	5.67	44.31	30.00	12.05	5.00	8333
Bowker's Animal Meal	6.11	44.94	30.00	12.94	5.00	8334
Bowker's Animal Meal	5.62	41.75	30.00	13.40	5.00	8355
Bowker's Animal Meal	6.04	40.50	30.00	12.32	5.00	8374
Bradley's Superior Meat Meal	6.06	43.56	40.00	15.95	15.00	8335
Old Fashioned Beef Scraps	7.93	49.13	40.00	19.60	10.00	8336

* Not guaranteed.

SUMMARY OF ANALYSES.

	Number of analyses.		PROTEIN.		FAT.	
			Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.
American Cotton Oil Co.'s Prime Cotton Seed Meal.		Highest	47.81	....	13.32	
	14	Lowest	42.25	43.00	8.80	9.00
		Average	45.71	....	10.75	
Southern Cotton Oil Co.'s Prime Cotton Seed Meal.	1	....	46.82	43.00	9.76	9.00
J. E. Soper & Co.'s Cotton Seed Meal.		Highest	46.13	....	14.72	
	2	Lowest	44.75	43.00	8.78	9.00
		Average	45.44	....	11.75	
R. B. Brown Oil Co.'s Prime Cotton Seed Meal.		Highest	47.88	....	9.97	
	2	Lowest	46.75	43.00	8.34	9.00
		Average	47.32	....	9.16	
S.W. Thaxter & Co.'s Cotton Seed Meal.		Highest	51.92	....	11.25	
	4	Lowest	48.69	49.25	10.33	15.62
		Average	50.48	....	10.79	
F. W. Brodé & Co.'s Owl Brand Cotton Seed Meal.		Highest	46.38	....	13.13	
	10	Lowest	43.31	43.00	9.90	9.00
		Average	44.68	....	11.90	
Sea Island Cotton Seed Meal.	2	Highest	25.06	....	7.09	
		Lowest	21.82	*	5.83	*
		Average	23.44	. ...	6.46	
Charles Pope Glucose Co.'s Cream Gluten Meal.		Highest	35.69	....	5.43	
	7	Lowest	30.94	37.12	2.24	3.20
		Average	33.22	....	3.53	
The Glucose Sugar Refin'g Co.'s. Chicago Gluten Meal.		Highest	40.63	38.00	2.79	3.37
	14	Lowest	36.13	36.00	1.70	2.00
		Average	38.01	....	2.15	
National Starch M'f'g Co.'s King Gluten Meal.		Highest	37.32	....	16.40	
	11	Lowest	31.50	32.00	4.28	16.00
		Average	33.62	....	11.72	
Arthur R. Hopkins's Imperial Gluten Meal.	1	....	20.13	20.00	12.00	11.50
American Glucose Co.'s Buffalo Gluten Feed.	1	....	28.25	29.00	4.68	3.00
S. W. Thaxter & Co.'s Gluten Feed.	1	.. ..	22.63	....	5.93	......
The Glucose Sugar Refin'g Co.'s Rockford Diamond Glut. Feed.		Highest	25.75	....	4.43	
	4	Lowest	24.69	24.20	3.44	3.75
		Average	25.33	....	3.95	
Douglas & Co.'s. Old Process Oil Meal.	1	....	26.63	36.94	6.45	6.58
Cleveland Linseed Oil Co.'s Cleveland Flax Meal.	1	....	39.75	39.00	2.28	1.50
Cleveland Linseed Oil Co.'s Linseed Oil Meal.	1	.. ..	36.81	39.00	2.52	1.50

* For guarantees see page 11.

SUMMARY OF ANALYSES—CONCLUDED.

			PROTEIN.		FAT.	
	Number of analyses.		Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.
The American Cereal Co.'s		Highest	9.94	....	4.92	
Victor Corn and Oat Feed.	11	Lowest	8.12	9.46	2.85	3.92
		Average	9.06	....	3.83	
S. A. & J. H. True Co.'s Corn and Oat Feed.	1	....	8.38	9.63	3.44	4.23
The American Cereal Co.'s		Highest	11.13	....	3.97	
Quaker Oat Feed.	9	Lowest	7.44	12.03	2.57	3.49
		Average	8.96	....	2.96	
The American Cereal Co.'s American Poultry Food.	1	....	14.19	....	5.91	.....
The American Cereal Co.'s Corn, Oat and Barley Feed.	1	....	12.75	11.26	5.39	4.15
W. H. Haskell & Co.'s Haskell's Oat Feed.	1	....	11.31	9.62	7.91	7.66
Andrew Cullen & Co.'s Crescent Oat Feed.	1	....	8.63	....	3.72	......
Monarch Oat Feed.	1	....	11.19	10.25	8.79	7.47
The H-O Co.'s		Highest	18.31	....	5.92	
Poultry Feed.	3	Lowest	17.81	16.80	5.43	7.00
		Average	18.04	....	5.70	
The H-O Co.'s		Highest	20.94	....	5.42	
Standard Dairy Feed.	3	Lowest	17.06	18.75	4.24	7.25
		Average	19.46	....	5.02	
The H-O Co.'s		Highest	11.94	....	4.75	
Horse Feed.	3	Lowest	11.69	12.30	3.81	4.90
		Average	11.81	....	4.36	
E. W. Blatchford's Calf Meal.	1	....	33.44	....	5.23	.....
Bowker Fertilizer Co.'s		Highest	44.94	....	14.05	
Bowker's Animal Meal.	5	Lowest	40.50	30.00	12.05	5.00
		Average	42.51	....	12.95	
Bradley Fertilizer Co.'s Superior Meat Meal.	1	....	43.56	40.00	15.95	15.00
Bradley Fertilizer Co.'s Old Fashioned Beef Scraps.	1	....	49.13	40.00	19.60	10.00

J. M. BARTLETT, *Chemist.*

O. W. KNIGHT, } *Assistant*
A. J. PATTEN, } *Chemists.*

COTTON SEED MEAL.

Pure cotton seed meal is made by grinding the seed after the white down, which remains upon the seed as it comes from the gotton gin, and the hard hulls have been removed. Decorticated cotton seed meal thus prepared carries from forty to fifty-three per cent of protein. From the ease with which hulls may be ground with the cotton seed, this class of goods offers peculiar opportunity to dishonest manufacturers and dealers. When the feeding stuff law went into effect in the fall of 1897 the State was filled with inferior goods carrying from twenty-two to thirty per cent of protein. In the spring of 1898 the inspectors reported a few lots of these goods. In November, 1898, only two lots of low grade cotton seed meal were found by the inspectors, and these samples were guaranteed in accordance with their low grade. Occasionally the Station has had sent to it by correspondents samples of suspected meal, but analyses have shown them to be up to guarantee.* Not all dark colored meal is adulterated and not all bright yellow meal is free from adulteration. The following statement made in bulletin 44 apparently represents the status of low grade cotton seed meal at present: "Goods of this type were very abundant in this State in 1897 but there are almost none of them to be found at present. The inspection law has driven them to other states."

As will be seen from the analyses the cotton seed meals agree quite closely with the guaranteed analyses.

GLUTEN MEALS AND FEEDS.

Gluten meals and gluten feeds are by-products left in the manufacture of starch and glucose from Indian corn. Corn consists largely of starch. The waste product from the manufacture of starch or sugar is relatively much richer in oil and protein than corn. Many factories are removing part of the corn oil from the waste, so that some gluten meals carry but little oil. This reduction in fat is an advantage, as feeding corn oil to dairy animals seems to have a tendency to make the butter soft. No by-products used for feeding differ more from each other than do these starch and sugar wastes. All manufacturers apparently do not recognize that the composition of these offals change greatly, and some of them have based their guarantees upon old analyses.

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* After this Bulletin was in press one low grade *unguaranteed* sample has been received.

Cream gluten meal is not up to the guarantee in protein. It is guaranteed to carry thirty-seven per cent, but from the samples drawn the purchaser can not expect more than thirty-three per cent of protein on the average, and one sample ran as low as thirty-one per cent of protein. The attention of the handlers of this feed has been called to these discrepancies between guarantee and analysis and they will probably be corrected on future shipments.

Fourteen samples of Chicago gluten meal were collected by the inspectors. These samples represent both old and new goods. The old goods were guaranteed too high in fat. The present guarantee, thirty-eight per cent protein and two per cent fat, fairly well represents the goods on the market. The protein found in the samples examined, agrees as closely as can be expected with the guarantees. The State agents seem to be anxious that their guarantees shall represent the goods as sold.

King gluten meal as sold in Maine comes from two mills, the output of which differs greatly in composition. The goods made at the Des Moines mill are very close with the guarantee, thirty-two per cent protein and sixteen per cent fat; the goods from the Indianapolis mills are higher in protein than the guarantee and are correspondingly low in fat. The Indianapolis goods carry about thirty-four per cent protein and four per cent of fat. The attention of the dealers has been called to this and the goods will by correctly branded in the near future.

GLUTEN FEEDS.

But little gluten feed is offered in the State. That found agreed in composition with the guarantee. At Bath a small amount of gluten feed was found which did not carry any guarantee.

LINSEED MEAL.

Only three samples of linseed meal were found by the inspectors. Its high cost, relative to cottonseed meal, has apparently crowded it out of the market. The guarantee of Douglass & Company's oil meal was based upon an analysis of a sample sent to the Station months before by the wholesaler, who writes as follows: "When you analyzed our oil meal we had a large quantity on hand, and we tagged as you directed. It is so high now that very little is sold and we have had a few lots that we have sold and we supposed was of same quality. We have not at present a single sack in our store."

OAT FEEDS.

A number of samples of different oat feeds have been examined. For the most part guarantees are based upon single analyses of the feeds and the goods usually are not quite as good as the sample upon which the guarantee rests. With the exception of the American Cereal Company's Quaker Oat Feed none of these materials are much below and some run above the guarantee.

BLATCHFORD'S CALF MEAL.

This is a manufactured food only one lot of which was found by our inspectors. This was not guaranteed but carried 33.44% protein and 5.23% of fat. In some advertising matter connected with Blatchford's calf meal it is claimed that 12.8 pounds of it has three and one-half pounds of protein, which is about twenty-seven and one-half per cent. A sample of these goods sent by a dealer to the Station in September analyzed as follows:

Water, 7.70%; ash, 5.46%; protein, 25.63%; crude fiber, 5.28%; starch, 18.24%; undetermined carbohydrates, 32.13%; fat, 5.56%. It will be observed that the goods as evidenced by the official sample and this lot sent to the Station are very uneven in composition;—one sample carrying about 26% and the other about 33% of protein. A large part of the ash is common salt.

These goods were sent to an expert on food mixtures and adulterations at the Connecticut Experiment Station who reports as follows: "I have examined Blatchford's calf meal under the microscope and find it contains linseed meal, some product from the wheat kernel, some product from the bean kernel and a little fenugreek. The linseed meal appears to be the chief constituent. The wheat product is bran, middlings or some similar product consisting of starchy matter mixed with more or less of the seed coats. Bean bran was present in considerable amount and more or less of the starchy matter."

In a letter just at hand from Mr. J. W. Barwell, the proprietor of these goods, he says: "Regarding the ingredients, I cannot give you the exact constituents of it, but I may say that it is composed mostly of locust bean meal with leguminous seeds such as lentils, etc., and oleaginous seeds such as flax-seed, fenugreek and annis seed, all cleaned, hulled and ground together and thoroughly well cooked. There is no cheap mill food and no low grade feed enters into this composition. I am prepared to go into any court in the United States and make an affidavit that there is no farmer in the United States that can compound Blatchford's calf meal for less than $3.50 per hundred."

Locust bean meal which Mr. Barwell claims to be the chief constituent of Blatchford's calf meal is practically not used in this country as a cattle feed. The average of ten English and German analyses show it to carry:—water, 14.96%; ash, 2.53%; protein, 5.86%; crude fiber, 6.39%; nitrogen-free extract, 68.98%; fat, 1.28%.

It is evident from the chemical analysis that locust bean meal cannot be the chief constituent of Blatchford's calf meal, but that the microscopist is correct that linseed meal is the chief constituent. Locust bean meal has only six per cent of protein and in order to make a mixture carrying from twenty-six to thirty-three per cent of protein, it would be necessary to add large quantities of goods like linseed meal rich in protein. As seen from the analysis Blatchford's calf meal has a feeding value somewhat inferior to old process linseed meal. Whatever it may cost to manufacture, no man who has sufficient intelligence to mix feeds can afford to buy it at anything like the price asked.

CHIEF REQUIREMENTS OF THE LAW.

The points of the law of most interest both to the dealer and consumer are concisely stated below.

Kinds of Feed coming within the Law. The law applies to all feeding stuffs *except* hays and straws; whole seeds and meals of wheat, rye, barley, oats, Indian corn, buckwheat and broom corn; brans and middlings. The principal feeds coming under the provisions of the law are linseed meals, cottonseed meals, pea meals, cocoanut meals, gluten meals, gluten feeds, maize feeds, starch feeds, sugar feeds, dried brewer's grains, malt sprouts, hominy feeds, cerealine feeds, rice meals, oat feeds, corn and oat chops, ground beef or fish scraps, mixed feeds, and all other materials of similar nature.

Inspection Tax and Tag. To meet the expenses of inspection, a tax of ten cents per ton must be paid to the Director of the Maine Agricultural Experiment Station. On receipt of the inspection tax, the Director of the Station is required to furnish a tag stating that all charges have been paid. This tag must be affixed to the package before it is offered for sale.

The Brand. Each package of feeding stuff included within the law shall have affixed the inspection tax tag and shall also bear, conspicuously printed, the following statements:

The number of net pounds contained in the package.
The name or trade mark under which it is sold.
The name of the manufacturer or shipper.
The place of manufacture.
The place of business of manufacturer or shipper.
The percentage of crude protein.
The percentage of crude fat.

These statements may be printed directly on the bag, on a tag attached to the package, or on the back of the inspection tax tag furnished by the Director of the Station.

A copy of the statement of brand must be filed with the Director of the Station. The goods must carry the inspection tax tag and the brand before they can be legally offered for sale in the State. It will not answer to affix tags at the time the goods are sold.

FREE ANALYSIS OF FEEDING STUFFS.

The Station officers take pains to obtain for analysis samples of all feeding stuffs coming under the law, but the co-operation of consumers is essential for the full and timely protection of their interests. Whenever any one believes that the law is being evaded in any way, he is requested to notify the Director of the Station.

The Station will promptly analyze, free of charge, samples of feeding stuffs *taken in accordance with directions furnished by the Station,* and report the results to the interested parties. Blanks containing full directions for drawing and forwarding samples will be sent on application.

CHAS. D. WOODS, *Director.*

CARE OF ORCHARDS.

W. M. MUNSON.

The fact that the apple is spontaneous in many parts of the State, and that orchards will exist and bear a partial crop of fruit though utterly neglected, is responsible for much of the ill-treatment seen on every hand. There is little doubt, however, that a well managed orchard is a most valuable farm property, and one of the surest sources of income. In view of the large number of orchards needing care, throughout the State, attention will, at this time, be given to this point rather than to planting.

RENOVATION.

Repair is not necessarily associated with old age and decay. Apple trees ten or fifteen years old sometimes need repairing quite as much as do old and neglected ones. When the orchard to be treated has been neglected for many years, the first operation, if the land does not need draining, is to prune thoroughly. In this operation, which may be performed at any time from late fall till the middle of May, care should be used that the trees are given an open head. This does not imply that all small side limbs should be removed, leaving a lot of whipstocks, but that such of the larger limbs as are parallel and close together, or those which cross, should be cut out. Half of the difficulty of pruning is done away with if one decides to allow the tree its natural form, rather than to attempt to shape it to some particular model.

Many growers suppose that pruning weakens the tree and shortens its life. There is, however, no reason for this belief, other than the general statement that "pruning is unnatural." But pruning is not unnatural. Man seldom prunes so heavily as does nature in removing superfluous limbs in the growth of young saplings in the forest. Furthermore, nature prunes at all seasons and in the rudest ways. By this it should not be understood, however, that care is not necessary in the mechanical operation of pruning. On the other hand, it is of the greatest importance that large limbs be removed with care and the wounds painted to prevent the entrance of fungi which will induce decay.

Trees are sometimes broken by heavy loads of fruit or by ice. In such matters, prevention is better than cure, and in training young trees, all crotches should be avoided. If bad crotches should be found to exist in trees ten or more years old, they should be braced by means of an iron bolt. Much damage may be avoided if bolts are used in season.

If the land on which the orchard is located has never been plowed, the surest way of stirring the soil and working in the necessary fertilizer is to fence off a portion of the area to be renovated, and turn in several hogs. The hogs, in rooting for grubs, will stir the soil as completely as would be possible with plow and harrow. The value of this treatment has been fully demonstrated at the farm of Charles S. Pope, Manchester, where most of the orchard work of this Station has been conducted. An orchard some fifty years old, which had not been plowed for more than twenty years, was treated as above noted, ten hogs being placed in the enclosure of about one and one-half acres in extent. The trees in this enclosure assumed a brighter, richer color which was noticeable from the street, half a mile distant. No accurate account of the yield of the trees in this plot as compared with others was kept, but Mr. Pope reports that there was a decided difference both in yield and in quality of the fruit. So satisfactory were the results that each year since the first trial a new area is set apart for similar treatment.

Not infrequently, during winters when the snow remains long on the ground, apple trees will be girdled by mice and rabbits. In such a case, "bridge grafting" is often practiced with satisfactory results; *i. e.* cions are set at frequent intervals about the trunk of the tree, one end being inserted underneath the bark above the wound, the other below. In this way the circulation of sap is maintained and the tree may be saved. The wound should be covered with grafting wax or with fresh cow dung, to exclude the air.

GRAFTING.

In starting a new orchard it is usually advisable to set trees which have been grafted in the nursery, rather than to set chance seedlings with the expectation of top-grafting them. Some varieties, as the Baldwin, do better when "top-worked," but even for such, nursery grown stock of Ben Davis, Northern Spy, Pewaukee or some other hardy, vigorous sort will give more uniform and satisfactory results than will seedlings.

While, in general, it is well to avoid top-grafting, there are few orchards in which some such work is not necessary, and many worthless seedlings, along the roadside and in the pastures, may be converted into valuable sources of income. The most successful grafting is that which disturbs the tree least. The first rule to observe, in grafting large trees is: "Graft many and small limbs." Before commencing to graft, decide carefully at what distance from the body, or from the center of the top, the main limbs should be cut to insure a good top. If a spread of six feet or ten feet from the center is decided upon, graft all of the main branches at that distance. In other words, one must plan for the future top of the tree; simply making the cions grow, being but a part of the operation. If the tree has been properly pruned, most of the more conspicuous branches should be grafted, and to avoid long pole-like limbs some cions should be set on the side branches of all the larger limbs. The practice of grafting a few large stubs low down, is not to be commended; the shock of removing a large portion of the top at one time is a serious one, and there is often injury from sunscald. A good grafter will leave enough small brush in the center of the tree to screen the trunk and larger branches.

Old neglected trees which are to be worked over, may with profit be given a preparatory pruning a year or two before grafting. Unnecessary limbs can be cut out better before grafting than afterwards. The ungrafted limbs must be gradually removed; the removal being made annually to about the extent of the growth of the cions, or a little more.

FERTILIZING.

The profit in fruit growing lies in securing an extra large amount of fruit of superior quality. This end can only be attained by the addition of a supply of plant-food in excess of that demanded for the growth of the trees. How much plant-food should be added is simply a matter of business that must be settled by each individual for his own farm. The actual fertility of the soil depends upon the plant as well as upon the amount and kind of plant-food in the soil; for only when the plant is in a healthy, vigorous condition can the maximum amount of food be appropriated. In most cases, as much depends upon the physical condition of the soil, as upon its chemical constitution.

In general, a liberal application of ground bone or phosphatic rock and of hardwood ashes will be found the most satisfactory fertilizing material for orchards. Stable manure may also be used with good effect, on soils deficient in organic matter; though for most orchards potash and phosphoric acid are desired, rather than nitrogen.

CULTURE.

Many good orchards are so located that cultivation is out of the question. There is no doubt, however, that where possible, thorough culture, especially while the orchard is young, is much to be desired. By cultivation, the soil is rendered in better condition for the feeding roots, the plant food is thus rendered more available, and the moisture is better conserved than in any other way. During the first years after planting, hoed crops may be grown between the trees, provided sufficient fertilizers are used. In no case, however, should a grain crop be grown, except as a cover crop to be plowed under in the spring. The accompanying illustrations clearly represent the value of culture. The cut on the opposite page represents an orchard of Fameuse, Northern Spy and Milding planted, as two-year-old trees, in 1892. The above illustration shows an orchard of similar varieties planted the next year. The first has been given thorough culture and was severely pruned in 1897; the other, separated from the first only by a fence, has been left without treatment, and a crop of hay has been taken off each year. Further remark is unnecessary.

SPRAYING.

Spraying is an easy and practical way of applying insecticides and fungicides. Insecticides act in two ways: (1) By poisoning the insects, when eaten; (2) by closing the breathing pores of the insects, or acting as an external irritant. Paris green is an example of the first class; kerosene emulsion or pyrethrum of the second. Hellebore, if applied in the dry form, acts in both ways. By spraying the trees with Paris green, some particles of the poison will be lodged upon the young fruit or upon the leaves; then as the insects attempt to enter the fruit, or to eat the foliage, they are destroyed.

Fungicides are of importance solely as preventives. The coating of Bordeaux mixture, or other material, upon the fruit and leaves, kills the germinating spores of the fungi before they penetrate the plant tissue. The time of spraying will naturally vary, depending on the purpose in view and the material used. The subject has been discussed in Bulletin 29.

ORCHARD WORK NOW IN PROGRESS AT THE EXPERIMENT STATION.

The principal orchard work now in progress at the Experiment Station is along the lines of tillage and fertilizers. At the farm of Charles S. Pope, Manchester, a young orchard, set on land which has never been plowed, has been laid off in plats, part of which are treated with concentrated fertilizers, and part with stable manure. Half of the orchard has been placed under cultivation, and the other half is heavily mulched.

Another orchard, on the same farm, has been divided into plats for treatment with different salts of potash, with a view to studying the effect, if any, upon quality of fruit and susceptibility to attack of apple scab.

In Aroostook County, as noted in previous reports, some of the more promising Russian varieties of apples, plums, and cherries are under trial; also some of the hardier American sorts. Such of these as have fruited were discussed in the Annual Report of this Station for 1896.

At present there are growing in the Station nurseries several hundred of the hardier standard apples which will next year be sent to different parts of the State, where encouragement to the fruit growing industry seems necessary. These varieties include Arctic, Shiawassee Beauty, Sutton Beauty, Westfield, etc.

INSPECTION OF FERTILIZERS, 1899.

This bulletin contains the analyses of manufacturers' samples of brands of fertilizers licensed before March 8, 1899.

The analyses which appear here are those made from manufacturer's samples, which are deposited under affidavit that they are reasonably near in composition to the corresponding brands found in the market.

The figures which are given as the percentages of valuable ingredients guaranteed by the manufacturers are the minimum percentages of the guarantee. If, for instance, the guarantee is 2 to 3 per cent. of nitrogen, it is evident that the dealer can not be held to have agreed to furnish more than 2 per cent., and so this percentage is taken as the actual guarantee. The figures under the head of "found" are those showing the actual composition of the samples deposited.

Descriptive List of Manufacturers' Samples, 1899.

Station number.	Manufacturer, place of business and brand.
	HIRAM BLANCHARD, EASTPORT, ME.
2114	Blanchard's Fish, Bone and Potash
2115	Blanchard's Ground Fish Scrap, No. 2
	BOWKER FERTILIZER CO., BOSTON, MASS.
1252	Bowker's Ammoniated Dissolved Bone
1868	Bowker's Bone and Wood Ash Fertilizer
1852	Bowker's Corn Phosphate
1251	Bowker's Farm and Garden Phosphate
1257	Bowker's Fresh Ground Bone
1579	Bowker's High Grade Fertilizer
1248	Bowker's Hill and Drill Phosphate
1872	Bowker's Market Garden Manure
1389	Bowker's Potato and Vegetable Phosphate
1390	Bowker's 6 % Potato Fertilizer
1249	Bowker's Special Fertilizers, Potatoes and Vegetables
1250	Bowker's Square Brand Bone and Potash
1866	Bowker's Staple Phosphate or 3 % Fertilizer
1867	Bowker's Superphosphate with Potash
1247	Bowker's Sure Crop Phosphate
1588	Bowker's 10 % Manure
1871	Gloucester Fish and Potash
1580	Stockbridge Corn and Grain Manure
1870	Stockbridge Pea and Bean Manure
1388	Stockbridge Potato and Vegetable Manure
1391	Stockbridge Seeding Down Manure
1869	Stockbridge Strawberry Manure
1392	Stockbridge Top Dressing Manure
	BRADLEY FERTILIZER CO., BOSTON, MASS.
2113	Bradley's Alkaline Bone with Potash
2112	Bradley's Complete Manure for Potatoes and Vegetables
1282	Bradley's Corn Phosphate
2111	Bradley's Eureka Fertilizer
1882	Bradley's Niagara Phosphate
1269	Bradley's Potato Fertilizer
1267	Bradley' Potato Manure
1265	Bradley's X. L. Phosphate
	CLARK'S COVE FERTILIZER CO., BOSTON, MASS.
1600	Bay State Defiance Phosphate
1217	Bay State Fertilizer
1219	Bay State Fertilizer for Seeding Down
1218	Bay State Fertilizer G. G
1215	King Philip Alkaline Guano for Potatoes
	THE CLEVELAND DRYER CO., BOSTON, MASS.
1607	Cleveland Fertilizer for All Crops
1608	Cleveland Pioneer Fertilizer
1264	Cleveland Potato Phosphate
2109	Cleveland Seeding Down Fertilizer
1263	Cleveland Superphosphate
	E. FRANK COE CO., NEW YORK, N. Y.
1901	E. Frank Coe's Bay State Phosphate
2117	E. Frank Coe's Columbian Special Corn Fertilizer
2118	E. Frank Coe's Columbian Special Potato Fertilizer

ANALYSES OF MANUFACTURERS' SAMPLES, 1899.

Station number.	NITROGEN.				PHOSPHORIC ACID.							POTASH.	
			Total.					Available.		Total.			
	As ammonia or nitrates.	As organic.	Found.	Guaranteed.	Soluble.	Reverted.	Insoluble.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.
	%	%	%	%	%	%	%	%	%	%	%	%	%
2114	.51	2.44	2.95	2.50	......	2.61	1.28	2.61	2.0	3.89	4.5	3.82	4.5
2115	.49	3.64	4.13	4.47	......	3.39	.89	3.39	3.5	4.43	4.5	1.44	1.0
1252	......	......	1.88	1.50	5.32	2.51	2.05	7.83	8.0	9.88	10.0	2.17	2.0
1868	......	......	1.99	1.50	......	......	2.00	8.86	6.0	10.86	8.0	3.09	2.0
1852	......	......	1.88	1.60	......	......	2.77	8.59	7.0	11.36	9.0	2.26	2.0
1251	......	......	1.86	1.50	5.27	3.01	7.79	8.28	8.0	10.07	10.0	2.21	2.0
1257	......	......	3.10	2.25	......	......	......	......	......	17.49	18.0	......	......
1579	......	......	2.76	2.25	7.71	2.37	1.92	10.08	8.0	12.00	10.0	4.68	4.0
1248	......	......	2.60	2.25	7.36	1.87	3.08	9.23	9.0	12.31	12.0	2.52	2.0
1872	......	......	2.18	2.25	......	......	2.33	7.80	6.0	10.13	8.0	10.95	10.0
1389	......	......	1.77	1.50	3.83	3.50	5.40	7.33	8.0	12.73	10.0	2.34	2.0
1390	......	......	1.01	.75	3.93	3.88	3.86	7.81	7.0	11.67	10.0	6.38	6.0
1249	......	......	2.54	2.25	3.79	2.54	4.31	6.33	8.0	10.64	10.0	4.42	4.0
1250	......	......	1.70	1.50	......	6.40	7.19	6.40	6.0	13.59	12.0	2.21	2.0
1866	......	......	1.00	.75	......	......	3.18	8.68	8.0	11.86	10.0	3.65	3.0
1867	......	......	......	......	......	......	2.82	10.70	10.0	13.52	11.0	3.19	2.0
1247	......	......	1.02	.75	4.09	3.75	4.07	7.84	8.0	11.91	10.0	1.16	1.0
1588	......	......	1.15	.75	1.30	5.17	3.61	6.47	6.0	10.08	8.0	10.98	10.0
1871	......	......	.97	.75	......	......	4.86	6.58	6.0	11.44	9.0	1.76	1.0
1580	......	......	3.33	3.00	6.78	1.85	1.91	8.63	8.0	10.54	10.0	6.55	6.0
1870	......	......	2.51	2.00	......	......	3.21	6.89	6.0	10.10	8.0	6.28	6.0
1388	......	......	3.43	3.25	3.12	2.11	4.26	5.25	6.0	9.49	7.0	9.76	10.0
1391	......	......	2.62	2.50	5.63	1.76	4.70	7.39	6.0	12.09	12.0	10.27	10.0
1869	......	......	2.29	2.25	......	......	3.30	6.96	6.0	10.26	7.0	4.79	4.0
1392	......	......	5.09	5.00	3.52	2.26	3.70	5.78	4.0	9.48	6.0	5.87	6.0
2113	......	......	2.61	......	6.73	4.25	2.18	10.98	11.0	13.16	12.0	3.71	2.4
2112	1.06	2.40	3.46	3.30	5.36	3.32	1.51	8.68	8.0	10.19	9.0	6.91	7.0
1282	......	......	2.59	2.05	6.79	3.18	1.42	9.97	9.0	11.39	10.0	1.68	1.5
2111	.11	1.06	1.17	1.03	5.93	2.35	1.55	8.28	8.0	9.83	9.0	2.32	2.0
1882	......	......	1.00	.82	......	......	1.10	8.56	7.0	9.66	8.0	1.56	1.1
1269	......	......	2.11	2.06	8.39	2.28	.93	10.67	9.0	11.60	11.0	3.07	3.2
1267	......	......	2.61	2.50	5.17	2.14	2.23	7.31	6.0	9.54	8.0	5.43	5.0
1265	......	......	2.70	2.50	7.55	3.58	1.48	11.13	9.0	12.61	11.0	2.27	2.0
1600	......	......	1.43	.82	7.46	1.72	1.61	9.18	7.0	10.79	9.0	2.10	1.0
1217	......	......	2.72	2.47	8.10	1.57	.96	9.67	9.0	10.63	10.0	2.65	2.0
1219	......	......	2.33	1.03	7.18	2.55	1.89	9.73	8.0	11.62	10.0	2.59	2.0
1218	......	......	2.36	1.85	7.38	2.34	1.81	9.72	8.5	11.53	10.0	2.62	2.0
1215	......	......	1.79	1.23	6.52	1.74	1.05	8.26	6.5	9.31	8.0	3.66	3.0
1607	......	......	1.48	1.03	6.71	2.16	2.35	8.87	8.0	11.22	9.0	2.42	2.0
1608	......	......	1.63	.82	6.80	2.39	1.83	9.19	7.0	11.02	9.0	2.00	1.0
1264	......	......	2.16	2.05	8.83	1.64	.97	10.47	8.0	11.44	10.0	3.21	3.0
2109	.11	1.06	1.17	1.03	5.79	2.89	1.27	8.68	8.0	9.95	9.0	2.20	2.0
1263	......	......	2.39	2.05	7.38	2.51	1.92	9.89	9.0	11.81	11.0	2.71	2.0
1901	.30	1.49	1.79	2.00	6.99	2.77	2.66	9.76	9.0	12.42	11.0	1.89	1.8
2117	.28	1.22	1.50	1.23	5.97	2.86	2.67	8.83	8.5	11.50	10.5	2.94	2.5
2118	.25	1.19	1.44	1.20	5.85	2.97	2.60	8.82	8.5	11.42	10.0	2.75	2.5

DESCRIPTIVE LIST OF MANUFACTURERS' SAMPLES, 1899.

Station number.	Manufacturer, place of business and brand.
2119	E. Frank Coe's Excelsior Potato Fertilizer
1617	E. Frank Coe's Grass and Grain Fertilizer
2116	E. Frank Coe's High Grade Ammoniated Bone Phosphate
1884	E. Frank Coe's High Grade Potato Fertilizer
2120	E. Frank Coe's Prize Brand Grain and Grass Fertilizer
1405	E. Frank Coe's Special Potato Fertilizer
2121	E. Frank Coe's Standard Grade Ammoniated Bone Phosphate
	CROCKER FERTILIZER AND CHEMICAL CO., BUFFALO, N. Y.
1855	Crocker's Ammoniated Corn Phosphate
1853	Crocker's New Rival Ammoniated Superphosphate
1856	Crocker's Potato, Hop and Tobacco Phosphate
1854	Crocker's Superior Fertilizer
	Crocker's Superior Rye and Oats Fertilizer
	CUMBERLAND BONE PHOSPHATE CO., PORTLAND, ME.
1899	Cumberland Bone and Potash
1601	Cumberland Hawkeye Fertilizer
1394	Cumberland Potato Fertilizer
1395	Cumberland Seeding Down Manure
1393	Cumberland Superphosphate
	L. B. DARLING FERTILIZER CO., PAWTUCKET, R. I.
2131	Darling's Animal Anchor Brand
2130	Darling's Animal Fertilizer "G" Brand
2129	Darling's Blood, Bone and Potash
	FRANK S. FARRAR & CO., BANGOR, ME.
1277	Farrar's Potato Manure
1276	Farrar's Superphosphate
	GREAT EASTERN FERTILIZER CO., RUTLAND, VT.
1578	Great Eastern Dissolved Bone
1230	Great Eastern General Fertilizer
1231	Great Eastern Grass and Oats Fertilizer
1233	Great Eastern Northern Corn Special
1232	Great Eastern Potato Manure
	E. L. LEWIS, ATLANTIC, MASS.
2132	Lewis Potato Fertilizer
	LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J.
2105	Lister's Seeding Down Fertilizer
2104	Lister's Special Potato Fertilizer
2103	Lister's Success Fertilizer
2102	Lister's "U. S." Superphosphate
	LOWELL FERTILIZER CO., BOSTON, MASS.
1874	Swift's Lowell Animal Fertilizer
1875	Swift's Lowell Bone Fertilizer
1876	Swift's Lowell Dissolved Bone and Potash
1873	Swift's Lowell Ground Bone
1879	Swift's Lowell Fruit and Vine Fertilizer
1877	Swift's Lowell Potato Phosphate
	NATIONAL FERTILIZER CO., BRIDGEPORT, CONN.
1885	Chittenden's Ammoniated Bone Fertilizer
1886	Chittenden's Complete Root Fertilizer
1887	Chittenden's Market Garden Fertilizer
	SAMUEL G. OTIS, HALLOWELL, ME.
1597	Otis Potato Fertilizer
1880	Otis Seeding Down Fertilizer
1620	Otis Superphosphate
	PACIFIC GUANO CO., BOSTON, MASS.
1605	Pacific Guano Company's Grass and Grain Fertilizer
1604	Pacific Guano Company's Potato Special
1234	Nobsque Guano
1235	Soluble Pacific Guano

ANALYSES OF MANUFACTURERS' SAMPLES, 1899.

Station number.	NITROGEN.				PHOSPHORIC ACID.							POTASH.	
			Total.					Available.		Total.			
	As ammonia or nitrates.	As organic.	Found.	Guaranteed.	Soluble.	Reverted.	Insoluble.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.
	%	%	%	%	%	%	%	%	%	%	%	%	%
2119	.65	2.02	2.67	2.50	6.14	1.34	1.27	7.48	8.0	8.75	9.0	9.91	8.0
1617	......	......	2.83	.80	7.88	2.96	3.63	10.84	8.5	14.47	10.0	1.21	1.5
2116	......	....	1.68	1.85	5.97	2.62	2.50	8.95	9.0	11.45	11.0	2.90	2.2
1884	......	......	2.50	2.40		......	1.29	7.71	7.0	9.00	8.0	7.86	6.5
2120	......	......	....	......	12.30	2.57	.47	14.87	10.5	15.34	12.0	.67	2.0
1405	......	.. .	1.95	1.65	7.43	1.82	4.20	9.25	8.0	13.45	10.0	4.58	4.0
2121	.27	1.26	1.53	1.20	6.32	2.33	2.87	8.65	8.5	11.52	10.0	2.45	2.2
1855	......	......	2.92	2.05	......	......	.58	12.21	10.0	12.79	11.0	2.43	1.6
1853	......	......	2.16	1.23	.....	......	.62	11.75	10.0	12.37	11.0	3.37	1.6
1856	......	......	2.42	2.05	......	......	.77	10.68	10.0	11.45	11.0	3.39	3.2
1854	......	......	.90	.82	.....	......	.83	8.86	8.0	9.69	9.0	2.06	2.0
....	......	......	.90	.82	......	......	.83	8.86	8.0	9.69	9.0	2.06	2.0
1899	......	... ..	.....	......	6.38	3.36	2.08	9.74	8.0	11.82	10.0	3.15	2.5
1601	......	.....	1.70	.82	7.45	1.42	1.90	8.87	7.0	10.77	9.0	2.08	1.0
1394	......	......	2.12	2.06	7.01	1.88	2.16	8.89	9.0	11.05	11.0	3.97	3.0
1395	......	......	1.10	1.03	5.82	1.98	2.11	7.80	8.0	9.91	10.0	2.93	2.0
1393	......	.....	2.08	2.06	5.96	3.36	1.92	9.30	8.0	11.22	10.0	3.56	2.0
2131	.23	2.32	2.55	1.65	5.73	2.69	.71	8.42	6.0	9.13	7.0	3.16	2.0
2130	.23	2.32	2.55	2.06	5.60	2.58	.62	8.18	6.0	8.80	7.0	4.64	4.0
2129	.96	2.84	3.80	4.12	5.50	3.12	.91	8.62	7.0	9.53	8.0	6.37	7.5
1277	......	......	2.33	2.25	3.03	7.19	5.99	10.22	9.0	16.21	12.0	3.32	3.0
1276	......	......	2.56	2.50	3.24	8.26	4.25	11.50	9.0	15.75	12.0	1.63	2.0
1578	......	......	......	.....	9.27	5.86	1.36	15.13	14.0	16.49	......	.. . .	. ....
1230	......	.....	1.10	.83	.69	9.25	2.26	9.94	8.0	12.20	......	4.72	4.0
1231	......	.. ...	......	......	4.11	6.88	4.08	10.99	11.0	15.07	......	2.15	2.0
1233	......	... ..	3.06	2.88	3.84	5.36	.74	9.20	8.0	9.94	......	3.42	2.0
1232	......	......	2.35	2.06	5.14	4.90	.68	10.04	8.0	10.72	......	5.71	4.0
2132	1.20	2.36	3.56	3.28	3.74	2.40	1.93	6.14	5.0	8.07	6.0	10.43	10.0
2105	.06	.84	.90	.62	7.58	2.64	2.47	10.22	10.0	12.69	11.0	1.06	1.0
2104	.25	1.46	1.71	1.65	5.87	2.52	2.38	8.39	8.0	10.77	9.0	2.94	3.0
2103	.27	1.22	1.49	1.24	7.23	2.33	2.43	9.56	9.5	11.99	11.5	2.06	2.0
2102	.19	1.35	1.54	1.32	5.09	2.34	2.03	7.43	7.0	9.46	8.0	2.39	2.0
1874	......	.....	2.85	2.46	......	......	1.01	10.38	9.0	11.39	10.0	4.10	4.0
1875	......	......	2.06	1.64	.....	......	1.31	8.27	8.0	9.58	9.0	3.56	3.0
1876	......	......	1.90	1.64	.....	......	1.73	9.33	9.0	11.06	10.0	2.45	2.0
1873	......	......	2.30	2.46	.. ...	....	......	......	5.0	27.72	28.0	......	.....
1879	......	.....	3.69	3.28	.....	......	.96	7.72	7.0	8.68	8.0	6.44	6.0
1877	......	. ....	2.61	2.46	.....	......	1.08	9.41	8.0	10.49	9.0	6.96	6.0
1885	......	......	2.42	1.60	......	......	1.61	9.72	9.0	11.33	10.0	3.69	2.0
1886	......	......	3.79	3.30	......	......	1.33	9.35	8.0	10.68	10.0	6.31	6.0
1887	......	......	3.02	2.40	......	......	2.90	7.29	7.0	10.19	9.0	5.83	6.0
1597	......	......	2.06	2.00	8.46	1.98	1.24	10.44	9.0	11.68	11.0	4.12	3.0
1880	......	......	1.36	1.50	.....	......	1.61	8.37	8.0	9.98	12.0	2.39	2.0
1620	......	......	2.57	2.00	6.44	4.72	1.85	11.16	9.5	13.01	11.0	2.77	2.0
1605	......	.....	1.82	.82	6.70	2.71	1.68	9.41	7.0	11.09	8.0	2.39	1.1
1604	......	.....	2.65	2.05	8.88	2.13	1.06	11.01	8.0	12.07	9.0	4.10	3.0
1234	......	......	1.23	1.15	6.23	2.68	2.44	8.91	8.0	11.35	9.0	2.25	2.0
1235	......	.....	2.37	2.25	7.33	2.42	1.85	9.75	8.5	11.60	10.5	2.61	2.0

DESCRIPTIVE LIST OF MANUFACTURERS' SAMPLES, 1899.

Station number.	Manufacturer, place of business and brand.
	PACKERS' UNION FERTILIZER CO., NEW YORK, N. Y.
1566	Packers' Union Animal Corn Fertilizer.
1567	Packers' Union High Grade Potato Manure
2126	Packers' Union Universal Fertilizer
1619	Packers' Union Wheat, Oats and Clover Fertilizer
	PARMENTER & POLSEY FERTILIZER CO., PEABODY, MASS.
2123	Plymouth Rock Brand
2122	"P. and P." Potato Fertilizer
2124	Parmenter & Polsey Special Potato Fertilizer
2125	Star Brand Superphosphate
	EDWIN J. PHILBRICK, AUGUSTA, ME.
1888	Philbrick's Fertilizer .
	PORTLAND RENDERING CO., PORTLAND, ME.
1616	Portland Rendering Co.'s Bone Tankage
	THE QUINNIPIAC CO., BOSTON, MASS.
1589	Quinnipiac Climax Phosphate
1590	Quinnipiac Corn Manure
1244	Quinnipiac Phosphate
1245	Quinnipiac Potato Manure
1591	Quinnipiac Potato Phosphate
1246	Quinnipiac Seeding Down Manure
	READ FERTILIZER CO., SYRACUSE, N. Y.
1396	Read's Practical Potato Special.
1397	Read's Standard
1587	Read's Sure Catch
1555	Read's Vegetable and Vine
1865	Sampson Fertilizer
	RUSSIA CEMENT CO., GLOUCESTER, MASS.
1410	Essex Complete Manure for Corn, Grain and Grass
1411	Essex Complete Manure for Potatoes, Roots and Vegetables
2106	Essex Corn Fertilizer
2108	Essex Potato Fertilizer
1568	Essex XXX Fish and Potash.
1891	Maine State Grange Chemicals
1892	Maine State Grange Potato Manure
2107	Maine State Grange Seeding Down Fertilizer
	SAGADAHOC FERTILIZER CO., BOWDOINHAM, ME.
1864	Dirigo Fertilizer
1863	Merrymeeting Superphosphate
1902	Sagadahoc Bone Meal
2127	Sagadahoc Special Potato Fertilizer
2128	Sagadahoc Superphosphate
1862	Yankee Fertilizer.
	STANDARD FERTILIZER CO., BOSTON, MASS.
1414	Standard "A" Brand
1890	Standard Bone and Potash
1223	Standard Fertilizer
1221	Standard Guano
1603	Standard Special for Potatoes
	HENRY F. TUCKER CO., BOSTON, MASS.
1846	Original Bay State Bone Superphosphate
	JOHN WATSON, HOULTON, ME.
2133	Watson's Improved Potato Manure.
	WILLIAMS & CLARK FERTILIZER CO., BOSTON, MASS.
1237	Americus Ammoniated Bone Superphosphate
1594	Americus Corn Phosphate
1595	Americus Potato Manure
1236	Royal Bone Phosphate for All Crops
1629	Williams & Clark Potato Phosphate
	A. F. YOUNG & CO., NEW YORK, N. Y.
2110	Young's Excelsior Potato Fertilizer

ANALYSES OF MANUFACTURERS' SAMPLES, 1899.

Station number.	Nitrogen.				Phosphoric Acid.							Potash.	
			Total.					Available.		Total.			
	As ammonia or nitrates.	As organic.	Found.	Guaranteed.	Soluble.	Reverted.	Insoluble.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.
	%	%	%	%	%	%	%	%	%	%	%	%	%
1566	.....	......	2.58	2.47	6.18	1.99	2.33	8.17	8.0	10.50	9.0	1.74	2.0
1567	......	......	2.11	2.06	6.50	1.49	1.96	7.99	8.0	9.95	9.0	8.05	6.0
2126	.08	1.02	1.10	.82	6.97	1.73	1.17	8.70	8.0	9.87	9.0	4.92	5.0
1619	.....	.....	.25	....	.....	......	1.20	10.92	11.0	12.12	.....	2.39	2.0
2123	.21	2.08	2.29	2.47	3.81	4.21	1.38	8.02	8.0	9.40	9.0	4.19	4.0
2122	.46	1.61	2.07	1.64	3.67	3.70	1.12	7.3	6.0	8.49	7.0	5.63	5.5
2124	1.69	1.29	2.98	3.29	4.21	4.27	1.29	8.48	8.0	9.77	9.0	7.41	7.0
2125	1.01	.79	1.80	1.64	3.80	3.54	1.15	7.34	7.0	8.49	8.0	2.60	2.5
1888	.38	1.65	2.03	2.00	2.00	5.19	1.74	7.19	7.0	8.93	9.0	5.58	5.0
1616	......	......	4.27	4.42	.....	7.34	12.06	7.34	......	19.40	18.6	......	....
1589	.....	......	1.28	1.03	4.61	4.02	2.64	8.63	8.0	11.27	9.0	2.54	2.0
1590	....	....	2.22	2.06	9.15	1.24	1.29	10.39	9.0	11.68	10.0	2.27	1.5
1244	......	....	2.74	2.47	7.91	1.47	1.11	9.38	9.0	10.49	10.0	2.72	2.0
1245	......	.....	2.71	2.47	5.85	1.82	2.26	7.67	6.0	9.93	7.0	5.80	5.0
1590	......	......	2.15	2.05	8.78	1.64	.90	10.42	8.0	11.32	9.0	3.66	3.0
1246	......	......	1.23	.82	6.59	2.87	2.26	9.46	9.0	11.72	10.0	2.26	2.0
1396	......	.....	1.20	.82	3.39	1.55	.54	4.94	4.0	5.48	5.0	8.35	8.0
1397	.....	......	1.15	.82	6.50	1.73	.92	8.23	8.0	9.15	9.0	4.33	4.0
1587	......	......	......	......	7.89	1.63	1.56	9.52	6.0	11.08	7.0	5.06	4.0
1555	......	......	1.96	1.65	5.04	1.21	1.55	6.25	6.0	7.80	7.0	7.96	8.0
1865	......	.....	1.97	1.65	......	......	1.51	6.75	6.0	8.26	7.0	4.42	4.0
1410	......	.....	4.00	3.70	3.02	6.39	2.51	9.41	7.0	11.92	9.5	10.52	9.5
1411	.....	.....	3.96	3.70	2.60	5.54	2.84	8.14	7.0	10.98	9.0	9.18	8.5
2106	.52	1.72	2.24	2.00	5.31	4.03	4.14	9.34	9.0	13.48	11.0	3.33	3.0
2108	.63	1.55	2.18	2.00	5.50	4.18	4.08	9.68	9.0	13.76	11.0	5.57	5.0
1568	......	.....	2.68	2.10	8.00	2.63	2.56	10.63	9.0	13.19	12.0	2.75	2.25
1891	.82	1.58	2.40	2.50	2.45	5.71	3.89	8.16	8.0	12.05	12.0	4.72	4.0
1892	......	1.02	1.02	1.50	1.34	7.11	3.67	8.45	9.0	12.12	12.0	12.43	12.0
2107	....	1.91	1.91	1.50	3.19	4.24	6.36	7.43	7.0	13.79	13.0	5.69	5.5
1864	......	......	1.85	2.00	......	.....	4.82	5.41	3.0	10.23	10.0	5.28	4.0
1863	......	......	1.50	1.50	......	......	3.78	7.72	5.0	11.50	9.0	2.73	2.0
1902	......	3.79	3.79	3.00	......	......	......	......	.....	18.42	20.0	.....	......
2127	2.15	.67	2.82	2.40	5.90	2.46	.75	8.36	6.0	9.11	10.0	8.11	7.0
2128	1.11	1.16	2.27	2.10	7.11	2.84	1.18	9.95	6.0	11.13	10.0	4.61	4.0
1862	......	....	.82	.50	......	......	2.12	9.03	3.0	11.15	7.0	2.77	1.5
1414	......	......	1.33	.82	4.84	3.08	1.96	7.92	7.0	9.88	9.0	1.71	1.0
1890	.....	......	......	......	6.94	3.03	1.51	9.97	8.0	11.48	10.0	4.10	2.5
1223	....	.....	2.44	2.00	7.36	2.64	1.96	10.00	8.0	11.96	10.0	2.67	2.0
1221	.....	......	1.75	1.25	6.59	2.02	1.09	8.61	6.5	9.70	8.5	3.69	3.0
1603	.....	......	2.43	2.05	8.00	2.98	1.03	10.98	8.0	12.01	9.0	3.78	3.0
1846	.....	......	2.40	2.06	.....	......	2.42	9.43	9.0	11.85	11.0	2.69	2.0
2133	.19	2.03	2.22	2.50	3.14	3.85	.84	6.99	6.00	7.83	7.00	6.52	5.00
1237	.....	.....	2.80	2.47	7.85	1.65	.79	9.50	9.0	10.29	10.0	2.63	2.0
1594	.....	......	2.27	2.06	8.76	.33	2.56	9.09	9.0	11.65	10.0	2.03	1.5
1595	......	.....	2.07	2.06	9.08	.96	1.24	10.04	8.0	11.28	9.0	3.53	3.0
1236	......	.....	1.26	1.03	6.20	3.11	2.23	9.30	7.0	11.54	8.0	2.26	2.0
1629	......	......	2.71	2.47	......	......	2.30	7.86	6.0	10.16	7.0	5.54	5.0
2110	2.22	1.14	3.36	2.88	5.02	.86	.29	5.88	5.5	6.17	.....	12.25	10.0

THE CHIEF PROVISIONS OF THE FERTILIZER LAW APPLYING TO MANUFACTURERS, IMPORTERS AND DEALERS.

The law for the regulation of the sale and analyses of commercial fertilizers makes the following requirements upon manufacturers, importers or dealers who propose to sell or offer for sale commercial fertilizers in the State:

1. *The Brand.* Each package shall bear, conspicuously printed, the following statements:

The number of net pounds contained in each package.
The name or trade mark under which it is sold.
The name of the manufacturer or shipper.
The place of manufacture
The place of business of manufacturer or shipper.
The percentage of nitrogen or its equivalent in ammonia.
The percentage of potash soluble in water.
The percentage of phosphoric acid in available form.
The percentage of total phosphoric acid.

2. *The Certificate.* There shall be filed annually between Nov. 15 and Dec. 15 with the Director of the Station a certificate containing an accurate statement of the brand. This certificate applies to the next succeeding calendar year. (Blanks for this purpose will be furnished on application to the Station.)

3. *Manufacturer's Samples.* There shall be deposited annually, unless excused by the Director under certain conditions, a sample of fertilizer, with an accompanying affidavit that this sample "corresponds within reasonable limits to the fertilizer which it represents."

4. *Analysis fee.* For each brand of fertilizer sold or offered for sale in the state there shall be paid annually to the Director of the Station "an analysis fee as follows: Ten dollars for the phosphoric acid and five dollars each for the nitrogen and potash, contained or said to be contained in the fertilizer."

5. *The license.* Upon receipt of the fee, the certificate and the sample (if required), the Director of the Station "shall issue a certificate of compliance."

[The full text of the law will be sent to those asking for it.]

CHAS. D. WOODS, *Director.*

FEEDING STUFF INSPECTION.

CHAS. D. WOODS.

Samples of the feeding stuffs coming under the inspection law, drawn in November, 1898, were analyzed and the results were published in January, 1899, as bulletin 48 of the Station. The inspectors visited most of the larger dealers again in January. At this time, samples were drawn from goods which had not been previously sampled and the results of the analyses are given in the pages which follow. In addition to the analyses here reported quite a large number of samples sent to the Station by correspondents have been analyzed and the results sent to them. In only one instance have correspondents' samples shown inferior goods and that is discussed below. The results of these analyses are not here reported as they agree substantially with the official samples.

Cotton Seed Meal. During the year about 200 samples of cotton seed meal have been examined, chiefly from the dairy sections of the State including the counties of Hancock, Waldo, Penobscot, Piscataquis and the whole of the State west of the Kennebec. Of these samples, two were low grade, *unguaranteed* goods in Hancock county. Upon writing the dealers calling attention to the violations of the law in selling unbranded goods, they took the necessary steps to conform to the law. Three samples of low grade goods found in Androscoggin and Penobscot counties were from the same wholesale house. The firm claimed that their shipper made a mistake in tagging one of the Androscoggin cotton seed meals and that instead of having tags guaranteeing 43 per cent of protein, the meal should have carried tags guaranteeing 25 per cent. The change of tags were made.

The other Androscoggin and the Penobscot county low grade meal was from the same car. This was one of ten cars bought by the wholesale house. As soon as notified of the inferior quality of the goods the guarantee was changed on the stock in the hands of the retailers and the order for the other cars (not then delivered) was countermanded. The law in this instance not only brought it about that the low grade goods in the State were properly guaranteed, but through its operation a number of cars of low grade cotton seed meal were kept out of the State.

[Continued on page 44.]

MANUFACTURERS AND PLACE OF SAMPLING.

Station number.	Manufacturer or Jobber.	Manufactured at	Sampled at
8485	American Cotton Oil Co	Huntsville, Ala	Brownfield
8486	American Cotton Oil Co	Brinkley, Ark	Fryeburg
8487	American Cotton Oil Co	Little Rock, Ark	South Windham
8493	American Cotton Oil Co	Nashville, Tenn	West Falmouth
8505	American Cotton Oil Co	Nashville, Tenn	Lock Mills
8484	American Cotton Oil Co		Camden
8506	American Cotton Oil Co		Dover
8494	The Southern Cotton Oil Co	Memphis, Tenn	Bath
8495	The Southern Cotton Oil Co	Memphis, Tenn	Sebago Lake
8496	The Southern Cotton Oil Co	Memphis, Tenn	Hampden
8497	The Southern Cotton Oil Co	Memphis, Tenn	Bangor
8498	The Southern Cotton Oil Co.	Memphis, Tenn	Westbrook
8499	The Southern Cotton Oil Co	Memphis, Tenn	Waldoboro
8500	The Southern Cotton Oil Co	Memphis, Tenn	Brunswick
8625	The Southern Cotton Oil Co	Memphis, Tenn	Phillips
8538	The Southern Cotton Oil Co	Memphis, Tenn	Berwick
8501	The Southern Cotton Oil Co	Newport, Ark	Houlton
8502	The Southern Cotton Oil Co	Newport, Ark	Newport
8503	The Southern Cotton Oil Co	Newport, Ark	Dexter
8504	The Southern Cotton Oil Co	Newport, Ark	Stroudwater
8478	O. Holway & Co		Greene
8617	O. Holway & Co		Readfield
8815	*		Dover
8523	R. B. Brown Oil Co	St. Louis, Mo	Pittsfield
8524	R. B. Brown Oil Co	St. Louis, Mo	Bath
8525		St. Louis, Mo	Dexter
8618		St. Louis, Mo	Norridgewock
8479	Chapin & Co	St. Louis, Mo	Belfast
8509	Chapin & Co	St. Louis, Mo.	Milo
8510	Chapin & Co	St. Louis, Mo	Bangor
8511	Chapin & Co	St. Louis, Mo	Newport
8512	Chapin & Co	St. Louis, Mo	Belfast
8513	Chapin & Co	St. Louis, Mo	Portland
8514	Chapin & Co	St. Louis, Mo	Orrington
8541	Chapin & Co	St. Louis, Mo.	North Fayette
8488	F. W. Brodé & Co	Memphis, Tenn	Hiram
8489	F. W. Brodé & Co	Memphis, Tenn	Cornish
8490	F. W. Brodé & Co	Memphis, Tenn	Richmond
8491	F. W. Brodé & Co	Memphis, Tenn	Dexter
8492	F. W. Brodé & Co	Memphis, Tenn	Winterport
8507	F. W. Brodé & Co	Memphis, Tenn	Westbrook
8508	F. W. Brodé & Co	Memphis, Tenn	East Poland
8619	F. W. Brodé & Co	Memphis, Tenn	Norridgewock
8645	F. W. Brodé & Co	Memphis, Tenn	Bethel
8650	F. W. Brodé & Co	Memphis, Tenn	Albion
8519	*		Norway
8520	*		Bangor
8521	*		Bucksport

* Brand incomplete. Name of manufacturer and place of business not given.

ANALYSES OF SAMPLES.

Name of Feed.	Protein.		Fat.		Station Number.
	Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.	
Prime Cotton Seed Meal	43.44	43.00	9.64	9.00	8485
Prime Cotton Seed Meal	40.25	43.00	10.27	9.00	8486
Prime Cotton Seed Meal	45.50	43.00	9.86	9.00	8487
Prime Cotton Seed Meal	45.00	43.00	10.39	9.00	8493
Prime Cotton Seed Meal	45.69	43.00	10.54	9.00	8505
Prime Cotton Seed Meal	46.00	43.00	9.96	9.00	8484
Prime Cotton Seed Meal	45.63	43.00	11.01	9.00	8506
Prime Finely Ground Cotton Seed Meal	41.38	43.00	11.32	9.00	8494
Prime Finely Ground Cotton Seed Meal	42.50	43.00	10.51	9.00	8495
Prime Finely Ground Cotton Seed Meal	43.13	43.00	12.21	9.00	8496
Prime Finely Ground Cotton Seed Meal	44.19	43.00	12.38	9.00	8497
Prime Finely Ground Cotton Seed Meal	42.81	43.00	12.26	9.00	8498
Prime Finely Ground Cotton Seed Meal	42.88	43.00	11.55	9.00	8499
Prime Finely Ground Cotton Seed Meal	42.88	43.00	11.39	9.00	8500
Prime Finely Ground Cotton Seed Meal	46.50	43.00	10.58	9.00	8625
Prime Finely Ground Cotton Seed Meal	44.06	43.00	12.02	9.00	8538
Prime Finely Ground Cotton Seed Meal	45.25	41.00	10.48	9.00	8501
Prime Finely Ground Cotton Seed Meal	45.63	41.00	11.46	9.00	8502
Prime Finely Ground Cotton Seed Meal	45.50	41.00	10.63	9.00	8503
Prime Finely Ground Cotton Seed Meal	45.13	41.00	10.62	9.00	8504
Prime Memphis Cotton Seed Meal	24.44	25.50	7.35	5.71	8478
Prime Memphis Cotton Seed Meal	23.94	25.50	6.60	5.71	8617
Prime Memphis Cotton Seed Meal	45.13	43.00	13.49	9.00	8515
Prime Cotton Seed Meal	44.56	43.00	13.61	9.00	8523
Prime Cotton Seed Meal	45.75	43.00	12.83	9.00	8524
Prime Cotton Seed Meal	23.31	43.00	6.57	9.00	8525
Prime Cotton Seed Meal	22.38	43.00	6.77	9.00	8618
Cotton Seed Meal	42.50	43.00	10.06	9.00	8479
Cotton Seed Meal	45.50	43.00	9.25	9.00	8509
Cotton Seed Meal	45.25	43.00	10.10	9.00	8510
Cotton Seed Meal	44.81	43.00	10.44	9.00	8511
Cotton Seed Meal	42.38	43.00	9.37	9.00	8512
Cotton Seed Meal	42.63	43.00	11.02	9.00	8513
Cotton Seed Meal	45.06	43.00	9.54	9.00	8514
Cotton Seed Meal	44.25	43.00	10.23	9.00	8541
Owl Brand Cotton Seed Meal	43.50	43.00	12.89	9.00	8488
Owl Brand Cotton Seed Meal	45.13	43.00	9.38	9.00	8489
Owl Brand Cotton Seed Meal	45.63	43.00	13.40	9.00	8490
Owl Brand Cotton Seed Meal	43.94	43.00	10.98	9.00	8491
Owl Brand Cotton Seed Meal	48.69	43.00	10.31	9.00	8492
Owl Brand Cotton Seed Meal	45.50	43.00	9.96	9.00	8507
Owl Brand Cotton Seed Meal	45.06	43.00	10.15	9.00	8508
Owl Brand Cotton Seed Meal	44.81	43.00	10.73	9.00	8619
Owl Brand Cotton Seed Meal	42.80	43.00	10.19	9.00	8645
Owl Brand Cotton Seed Meal	45.44	43.00	10.34	9.00	8650
"Daisy Brand" Cotton Seed Meal	45.06	43.00	9.42	9.00	8519
"Daisy Brand" Cotton Seed Meal	42.88	43.00	14.08	9.00	8520
"Daisy Brand" Cotton Seed Meal	45.88	43.00	9.86	9.00	8521

MANUFACTURERS—Continued.

Station Number.	Manufacturer or Jobber.	Manufactured at	Sampled at
8522	*		Portland
8643	*		Rumford
8482	D. M. Hawkins & Co	Memphis, Tenn	Bowdoinham
8483	D. M. Hawkins & Co	Memphis, Tenn	Portland
8624	D. M. Hawkins & Co	Memphis, Tenn	Farmington
8516	Hunter Bros		Dexter
8517	Hugh Petit & Co		Mechanic Falls
8526	J. E. Soper & Co		Yarmouth
8527	J. E. Soper & Co		Corinna
8529	J. E. Soper & Co		Mechanic Falls
8528	Dyersburg Oil & Fertilizer Co	Dyersburg, Tenn	Belfast
8536	Dyersburg Oil & Fertilizer Co	Dyersburg, Tenn	South Berwick
8539	Doten Grain Co		Waterboro
8530	*		Steep Falls
8531	*		Dexter
8534	*		Portland
8537	*		Springvale
8518	*		West Peru
8626	*		Wilton
8653	*		Augusta
8623	*		Winthrop
8622	*		Lewiston
8621	*		Livermore Falls
8620	*		North Anson
8532	*		Gorham
8533	*		South Paris
8644	*		Hartford
8481	*		Orland
8542	The Glucose Sugar Refining Co.		Richmond
8548	The Glucose Sugar Refining Co.		Belfast
8554	The Glucose Sugar Refining Co.		Camden
8544	The Glucose Sugar Refining Co.		Hampden
8551	The Glucose Sugar Refining Co.		East Poland
8543	The Glucose Sugar Refining Co.		Portland
8545	The Glucose Sugar Refining Co.		Bucksport
8546	The Glucose Sugar Refining Co.		Orrington
8547	The Glucose Sugar Refining Co.		Winterport
8549	The Glucose Sugar Refining Co.		Bangor
8550	The Glucose Sugar Refining Co.		Pittsfield
8552	The Glucose Sugar Refining Co.		Norway
8553	The Glucose Sugar Refining Co.		Dover
8630	The Glucose Sugar Refining Co.		Lewiston
8555	Charles Pope Glucose Co		Brunswick
8856	Charles Pope Glucose Co		Gorham
8857	Charles Pope Glucose Co		Bath
8858	Charles Pope Glucose Co		Portland
8859	Charles Pope Glucose Co		Wiscasset
8860	Charles Pope Glucose Co		Saco

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* Brand incomplete. Name of manufacturer and place of business not given.

ANALYSES—Continued.

Name of Feed.	Protein.		Fat.		Station Number.
	Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.	
"Daisy Brand" Cotton Seed Meal	45.38	43.00	10.32	9.00	8522
"Daisy Brand" Cotton Seed Meal	45.31	43.00	10.41	9.00	8643
Cotton Seed Meal	44.81	43.00	10.64	9.00	8482
Cotton Seed Meal	43.38	43.00	10.57	9.00	8483
Cotton Seed Meal	42.63	43.00	11.07	9.00	8624
Cotton Seed Meal	45.13	43.00	9.36	9.00	8516
Cotton Seed Meal	48.38	43.00	8.03	10.00	8517
Cotton Seed Meal	43.69	43.00	10.73	9.00	8526
Cotton Seed Meal	44.44	43.00	11.33	9.00	8527
Cotton Seed Meal	41.19	43.00	11.65	9.00	8529
Cotton Seed Meal	45.56	43.00	9.54	9.00	8528
Cotton Seed Meal	43.81	43.00	9.04	9.00	8536
Cotton Seed Meal	43.69	43.00	12.16	9.00	8539
Cotton Seed Meal	46.19	43.00	9.81	9.00	8530
Cotton Seed Meal	46.81	43.00	11.59	9.00	8531
Cotton Seed Meal	44.94	43.00	10.49	9.00	8534
Cotton Seed Meal	43.06	43.00	13.33	9.00	8537
Cotton Seed Meal	46.69	43.00	9.21	9.00	8518
Cotton Seed Meal	46.50	43.00	9.97	9.00	8626
Cotton Seed Meal	44.56	43.00	14.46	9.00	8653
Cotton Seed Meal	44.81	46.12	10.34	9.20	8623
Cotton Seed Meal	43.75	46.12	11.79	9.20	8622
Cotton Seed Meal	44.19	46.12	12.24	9.20	8621
Cotton Seed Meal	42.81	46.12	10.68	9.20	8620
Cotton Seed Meal	43.38	....	60.69	....	8532
Cotton Seed Meal	44.31	....	9.79	....	8533
Cotton Seed Meal	42.56	....	10.26	....	8644
Cotton Seed Meal	26.63	....	7.56	....	8481
Chicago Gluten Meal	37.44	38.00	3.27	2.00	8542
Chicago Gluten Meal	36.69	38.00	2.65	2.00	8548
Chicago Gluten Meal	37.19	38.00	3.02	2.00	8554
Chicago Gluten Meal	36.75	38.00	3.07	2.00	8544
Chicago Gluten Meal	38.81	38.00	2.75	2.00	8551
Chicago Gluten Meal	38.31	38.00	3.13	2.00	8543
Chicago Gluten Meal	34.50	38.00	3.61	2.00	8545
Chicago Gluten Meal	35.69	38.00	2.73	2.00	8546
Chicago Gluten Meal	38.06	38.00	3.36	2.00	8547
Chicago Gluten Meal	38.94	38.00	2.27	2.00	8549
Chicago Gluten Meal	37.94	38.00	2.71	2.00	8550
Chicago Gluten Meal	37.44	38.00	3.17	2.00	8552
Chicago Gluten Meal	38.25	38.00	3.27	2.00	8553
Chicago Gluten Meal	37.88	38.00	3.16	2.00	8630
Cream Gluten Meal	32.63	37.12	4.91	3.20	8555
Cream Gluten Meal	35.25	37.12	3.12	3.20	8551
Cream Gluten Meal	34.56	37.12	4.65	3.20	8557
Cream Gluten Meal	33.56	37.12	4.84	3.20	8558
Cream Gluten Meal	32.19	37.12	4.39	3.20	8559
Cream Gluten Meal	30.13	37.12	1.84	3.20	8560

MANUFACTURERS—Continued.

Station Number.	Manufacturer or Jobber.	Manufactured at	Sampled at
8633	Charles Pope Glucose Co		Lewiston
8562	National Starch Manf'g Co	Indianapolis, Ind	Bowdoinham
8568	National Starch Manf'g Co	Indianapolis, Ind	Milo
8569	National Starch Manf'g Co	Indianapolis, Ind	Foxcroft
8563	National Starch Manf'g Co	Des Moines, Ia	Old Town
8561	National Starch Manf'g Co	Des Moines, Ia	Sebago Lake
8564	National Starch Manf'g Co	Des Moines, Ia	Brunswick
8565	National Starch Manf'g Co	Des Moines, Ia	Dexter
8567	National Starch Manf'g Co	Des Moines, Ia	Norway
8629	National Starch Manf'g Co	Des Moines, Ia	Livermore Falls
8566	National Starch Manf'g Co	Des Moines, Ia	Steep Falls
8627	National Starch Manf'g Co	Des Moines, Ia	Bingham
8628	National Starch Manf'g Co	Des Moines, Ia	Winthrop
8570	The Glucose Sugar Refining Co.		South Paris
8571	The Glucose Sugar Refining Co.		West Paris
8572	The Glucose Sugar Refining Co.		Guilford
8573	The Glucose Sugar Refining Co.		Damariscotta
8631	The Glucose Sugar Refining Co.		Farmington
8632	The Glucose Sugar Refining Co.		Readfield Depot
8574	International Milling Co		Brunswick
8575	International Milling Co		Richmond
8634	International Milling Co		Lewiston
8576	The Cleveland Linseed Oil Co		Brownfield
8648	Mayflower Mills	Fort Wayne, Ind	Bath
8577	E. W. Blatchford & Co	Chicago, Ill	Brunswick
8587	American Cereal Co		Belfast
8588	American Cereal Co		Bowdoinham
8589	American Cereal Co		Bangor
8590	American Cereal Co		Bucksport
8591	American Cereal Co		Portland
8592	American Cereal Co		Foxcroft
8593	American Cereal Co		Island Falls
8594	American Cereal Co		Bethel
8595	American Cereal Co		Waldoboro
8636	American Cereal Co		Farmington
8637	American Cereal Co.		Bingham
8596	S. A. & J. H. True Co		Bath
8597	S. A. & J. H. True Co		Portland
8598	Commercial Milling Co		Ashland
8599	David Oliver	Joliet, Ill	Fryeburg
8600	The H-O Co	Buffalo, N. Y	Bowdoinham
8601	The H-O Co	Buffalo, N. Y	South Windham
8602	The H-O Co	Buffalo, N. Y	Portland
8635	The H-O Co	Buffalo, N. Y	Phillips
8639			Winthrop
8603	The H-O Co	Buffalo, N. Y	North Yarmouth
8604	The H-O Co	Buffalo, N. Y	North Yarmouth
8605	The H-O Co	Buffalo, N. Y	North Yarmouth

ANALYSES—Continued.

Name of Feed.	Protein.		Fat.		Station number.
	Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.	
Cream Gluten Meal	34.31	37.12	3.91	3.20	8633
King Gluten Meal	35.31	32.00	4.07	16.00	8562
King Gluten Meal	34.50	32.00	6.78	16.00	8568
King Gluten Meal	36.25	32.00	6.17	16.00	8569
King Gluten Meal	32.06	32.00	15.90	16.00	8563
King Gluten Meal	32.88	32.00	16.38	16.00	8561
King Gluten Meal	33.88	32.00	16.91	16.00	8564
King Gluten Meal	33.19	32.00	16.46	16.00	8565
King Gluten Meal	33.94	32.00	14.50	16.00	8567
King Gluten Meal	33.75	32.00	16.79	16.00	8629
King Gluten Meal	34.94	34.26	15.71	14.65	8566
King Gluten Meal	32.06	32.00	15.84	9.00	8627
King Gluten Meal	32.38	32.00	12.89	12.00	8628
Buffalo Gluten Feed	27.00	25.50	4.00	4.00	8570
Rockford Diamond Gluten Feed	24.56	24.20	4.54	3.76	8571
Rockford Diamond Gluten Feed	25.25	24.20	4.16	3.76	8572
Rockford Diamond Gluten Feed	21.31	24.20	5.02	3.76	8573
Rockford Diamond Gluten Feed	25.31	24.20	5.03	3.76	8631
Rockford Diamond Gluten Feed	25.25	24.20	4.67	3.76	8632
Sucrene Oil Meal	26.44	24.75	3.33	3.50	8574
Sucrene Oil Meal	23.63	24.75	3.26	3.50	8575
Sucrene Oil Meal	26.44	24.75	3.44	3.50	8634
Cleveland Flax Meal	37.00	39.00	3.03	1.50	8576
Old Process Linseed Meal	25.44	....	8.92	....	8648
Blatchford's Calf Meal	24.94	....	4.41	....	8577
Victor Corn and Oat Feed	11.25	9.46	4.65	3.92	8587
Victor Corn and Oat Feed	10.69	9.46	4.78	3.92	8588
Victor Corn and Oat Feed	8.63	9.46	3.44	3.92	8589
Victor Corn and Oat Feed	8.75	9.46	3.72	3.92	8590
Victor Corn and Oat Feed	8.56	9.46	3.80	3.92	8591
Victor Corn and Oat Feed	9.13	9.46	3.82	3.92	8592
Victor Corn and Oat Feed	9.63	9.46	4.63	3.92	8593
Victor Corn and Oat Feed	7.81	9.46	3.23	3.92	8594
Victor Corn and Oat Feed	10.38	9.46	5.12	3.92	8595
Victor Corn and Oat Feed	8.56	9.46	3.68	3.92	8636
Victor Corn and Oat Feed	9.69	9.46	3.66	3.92	8637
Corn and Oat Feed	9.13	9.63	3.42	4.23	8596
Corn and Oat Feed	9.19	9.63	3.39	4.23	8597
Ground Corn and Oats	9.44	....	2.89	....	8598
Lakeside Corn and Oat Feed	8.44	9.50	3.24	3.75	8599
Dundee Corn and Oat Feed	8.88	8.38	3.30	2.95	8600
Dundee Corn and Oat Feed	9.00	8.38	3.11	2.95	8601
Dundee Corn and Oat Feed	8.19	8.38	2.69	2.95	8602
Dundee Corn and Oat Feed	9.25	8.38	3.67	2.95	8635
Monarch Corn and Oat Feed	12.31	10.25	7.12	7.49	8639
The H-O Co.'s Standard Dairy Feed	16.50	18.75	4.48	7.25	8603
The H-O Co.'s Horse Feed	11.00	12.30	4.42	4.90	8604
The H-O Co.'s Poultry Feed	17.31	16.80	5.62	7.00	8605

MANUFACTURERS—Concluded.

Station number.	Manufacturer or Jobber.	Manufactured at	Sampled at
8606	The H-O Co	Buffalo, N. Y.	Bowdoinham
8607	The American Cereal Co		Brunswick
8608	The American Cereal Co		North Yarmouth
8609	The American Cereal Co		Westbrook
8610	The American Cereal Co		Richmond
8611	The American Cereal Co		Bath
8612	The American Cereal Co		Portland
8613	The American Cereal Co		Belfast
8614	The American Cereal Co		Foxcroft
8615	The American Cereal Co		Waldoboro
8616	W. H. Haskell & Co	Toledo, O.	West Falmouth
8638	Andrew Cullen		Madison
8480	Northwestern Fertilizer Co		Portland
8585	Northwestern Fertilizer Co.		Winterport
8578	Bradley Fertilizer Co		Bangor
8579	Bradley Fertilizer Co		Portland
8583	Bowker Fertilizer Co	Boston, Mass.	Portland
8580	Bowker Fertilizer Co	Boston, Mass	Bangor
8581	Bowker Fertilizer Co	Boston, Mass	Portland
8582	Bowker Fertilizer Co	Boston, Mass	Waldoboro
8584	B. Randall	East Boston, Mass.	Bowdoinham
8586	American Fertilizer Co		Bowdoinham

[Continued from page 37.]

In March a correspondent in Cumberland county sent a sample of very low grade cotton seed meal to the Station. This was one of two cars brought into the State by a wholesale house. As soon as their attention was called to the matter, the sale of the meal was stopped, that in the hands of the retailer was returned to them and together with the other car was sold into New Hampshire, which State is not protected by a law regulating the sale of feeding stuffs. This lot of meal was one of the poorest examined by the Station, and probably occasioned considerable loss from the shrinkage of milk flow as nearly a carload of it was sold in two towns before its poor quality was known. Much of the meal was fine and of fairly good appearance. The dealers claim that it has a *commercial* value equal to high grade cotton seed meal as fineness and brightness determine that. The meal had an *agricultural* value of less than one-half its guarantee.

In none of the above instances was there any evident intention of fraud. The dealers as soon as notified, and without wait-

ANALYSES—Concluded.

Name of Feed.	Protein.		Fat.		Station number.
	Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.	
The H-O Co.'s Poultry Feed	17.44	16.80	5.87	7.00	8606
American Cereal Co.'s Poultry Food	13.44	....	5.79	....	8607
American Cereal Co.'s Poultry Food	13.69	....	5.93	....	8608
Quaker Oat Feed	9.25	12.03	3.99	3.49	8609
Quaker Oat Feed	9.63	12.03	3.08	3.49	8610
Quaker Oat Feed	8.94	12.03	3.46	3.49	8611
Quaker Oat Feed	10.75	12.03	3.77	3.49	8612
Quaker Oat Feed	10.81	12.03	4.00	3.49	8613
Quaker Oat Feed	7.75	12.03	3.04	3.49	8614
Quaker Oat Feed	11.69	12.03	4.30	3.49	8615
Haskell's Oat Feed	9.50	9.62	6.51	7.66	8616
Crescent Oat Feed	7.81	10.90	2.99	3.70	8638
Horse Shoe Brand Ground Beef Cracklings for Poultry	64.63	60.00	19.61	16.00	8480
Horse Shoe Brand Ground Beef Cracklings for Poultry	66.44	60.00	16.95	16.00	8585
Bradley's Superior Meat Meal	52.25	40.00	9.40	15.00	8578
Bradley's Superior Meat Meal	53.94	40.00	9.48	15.00	8579
Bowker's Pure Beef Scraps	51.88	....	14.89	....	8583
Bowker's Animal Meal	42.13	30.00	12.45	5.00	8580
Bowker's Animal Meal	46.94	30.00	10.69	5.00	8581
Bowker's Animal Meal	39.69	30.00	11.21	5.00	8582
Pure Beef Scraps	47.44	....	23.08	....	8584
American Poultry Meal	38.06	....	22.44	....	8586

ing for an official notice from the Secretary of Agriculture, either stopped the sale of the goods, or made a guarantee corresponding to the facts. Although the law did not keep these goods out of the State, it has completely prevented their being knowingly sold.

To avoid this class of goods, dealers and consumers should use only reliable brands of cotton seed meal and should send samples of all goods to the Station for free analysis as offered on the last page of this bulletin.

Gluten Meal. With one exception, Chicago Gluten Meal was well up to guarantee in protein. The manufacturers are not sending the Indianapolis King Gluten into the State at present. The Des Moines King Gluten is well up to guarantee. The Chas. Pope Glucose Co.'s Cream Gluten meal continues to fall below the guarantee. Unless the quality is changed for the better, the consumer cannot count on Cream Gluten Meal to carry more than 33 per cent protein.

SUMMARY OF ANALYSES.

	Number of analyses.		PROTEIN.		FAT.	
			Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.
American Cotton Oil Co.'s Prime Cotton Seed Meal.	7	Highest	46.00	....	11.01	9.00
		Lowest	40.25	43.00	9.64	
		Average	44.50	....	10.24	
Southern Cotton Oil Co.'s Prime Finely Ground Cotton Seed Meal, Memphis, Tenn., Mill.	9	Highest	46.50	....	12.38	9.00
		Lowest	41.38	43.00	10.51	
		Average	43.37	... .	11.58	
Southern Cotton Oil Co.'s Prime Finely Ground Cotton Seed Meal, Newport, Ark., Mill.	4	Highest	45.63	....	11.46	9.00
		Lowest	45.13	41.00	10.48	
		Average	45.38	....	10.80	
O. Holway & Co.'s Prime Memphis Cotton Seed Meal.	2	Highest	24.44	....	7.35	5.71
		Lowest	23.94	25.50	6.60	
		Average	24.19	... .	6.98	
Manufacturer unknown. Prime Memphis Cotton Seed Meal.	1	....	45.13	43.00	13.49	9.00
R. B. Brown Oil Co.'s Prime Cotton Seed Meal.	2	Highest	45.75	....	13.61	9.00
		Lowest	44.56	43.00	12.83	
		Average	45.66	....	13.22	
Chapin & Co.'s Cotton Seed Meal.	8	Highest	45.50	....	11.02	9.00
		Lowest	42.38	43.00	9.25	
		Average	44.05	....	10.00	
F. W. Brodé & Co.'s Owl Brand Cotton Seed Meal.	10	Highest	48.69	....	13.40	9.00
		Lowest	42.80	43.00	9.38	
		Average	45.06	....	10.83	
"Daisy Brand" Cotton Seed Meal.	5	Highest	45.88	....	14.08	9.00
		Lowest	42.88	43.00	9.42	
		Average	44.90	....	10.82	
D. M. Hawkins & Co.'s Cotton Seed Meal.	3	Highest	44.81	....	11.07	9 00
		Lowest	42.63	43 00	10.57	
		Average	43.61	....	10.76	
Hunter Bros.' Cotton Seed Meal.	1	....	45.13	43.00	9.36	9.00
Hugh Petit & Co.'s Cotton Seed Meal.	1	....	48.38	43.00	8.03	10.00
J. E. Soper & Co.'s Cotton Seed Meal.	3	Highest	44.44	....	11.65	9.00
		Lowest	41.19	43.00	10.73	
		Average	43.11	....	11.27	
Dyersburg Oil & Fertilizer Co.'s Cotton Seed Meal.	2	Highest	45.56	....	9.54	9.00
		Lowest	43.81	43.00	9.04	
		Average	44.69	....	9.21	
Doten Grain Co.'s Cotton Seed Meal.	1	....	43.69	43.00	12.16	9.00
Manufacturers unknown. Cotton Seed Meal.	7	Highest	46.81	....	14.46	9.00
		Lowest	43.06	43.00	9.21	
		Average	45.54	....	11.27	
Manufacturers unknown. Cotton Seed Meal.	4	Highest	44.81	....	12.24	9.20
		Lowest	42.81	46.12	10.34	
		Average	43.89	....	11.26	

SUMMARY OF ANALYSES—Continued.

	Number of analyses.		PROTEIN.		FAT.	
			Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.
The Glucose Sugar Refin'g Co.'s Chicago Gluten Meal.	14	Highest	38.94	....	3.61	2.00
		Lowest	34.50	38.00	2.27	
		Average	37.42	....	3.01	
Charles Pope Glucose Co.'s Cream Gluten Meal.	7	Highest	35.25	... .	4.91	3.20
		Lowest	30.13	37.12	1.84	
		Average	33.23	....	3.95	
National Starch Manf'g Co.'s King Gluten Meal, Indianapolis, Ind., Mill.	3	Highest	36.25	....	6.78	16.00
		Lowest	34.50	32.00	5.67	
		Average	35.35	....	8.35	
National Starch Manf'g Co.'s King Gluten Meal, Des Moines, Iowa, Mill.	8	Highest	34.94	....	16.91	16.00
		Lowest	32.06	32.00	12.89	
		Average	33.28	....	15.63	
The Glucose Sugar Refin'g Co.'s Buffalo Gluten Feed.	1	.. . .	27.00	25.50	4.00	4.00
The Glucose Sugar Refin'g Co.'s Rochford Diamond Gluten Feed.	5	Hihgest	25.31	....	5.03	3.76
		Lowest	21.31	24.20	4.16	
		Average	24.34	....	4.69	
International Milling Co.'s Sucrene Oil Meal.	3	Highest	26.44	....	3.44	3.50
		Lowest	23.63	24.75	3.26	
		Average	25.50	....	3.34	
The Cleveland Linseed Oil Co.'s Cleveland Flax Meal.	1	... .	37.00	39.00	3.03	1.50
Mayflower Mills Old Process Linseed Meal.	1	....	25.44	....	8.92	
E. W. Blatchford & Co.'s Blatchford's Calf Meal.	1	....	24.94	....	4.41	
American Cereal Co.'s Victor Corn and Oat Feed.	11	Highest	11.25	....	5.12	3.92
		Lowest	8.56	9.46	3.23	
		Average	9.37	....	4.05	
S. A. & J. H. True Co.'s Corn and Oat Feed.	2	Highest	9.19	....	3.42	4.23
		Lowest	9.13	9.63	3.39	
		Average	9.16	....	3.41	
Commercial Milling Co.'s Ground Corn and Oats.	1	....	9.44	....	2.89	
David Oliver's Lakeside Corn and Oat Feed.	1	....	8.44	9.50	3.24	3.75
The H-O Co.'s Dundee Corn and Oat Feed.	4	Highest	9.25	....	3.67	2.95
		Lowest	8.19	8.38	2.69	
		Average	8.83	....	3.19	
Monarch Corn and Oat Feed.	1	....	12.31	10.25	7.12	7.49
The H-O Co.'s Standard Dairy Feed.	1	....	16.50	18.75	4 48	7.25
The H-O Co.'s Horse Feed.	1	....	11.00	12.30	4.42	4.90
The H-O Co.'s Poultry Feed.	2	Highest	17.44	....	5.87	7.00
		Lowest	17.31	16.80	5.62	
		Average	17.38	....	5.75	

SUMMARY OF ANALYSES—Concluded.

	Number of analyses.		Protein.		Fat.	
			Found—per cent.	Guaranteed—per cent.	Found—per cent.	Guaranteed—per cent.
The American Cereal Co.'s Poultry Food.	2	Highest	13.69	....	5.93	
		Lowest	13.44	....	5.79	
		Average	13.57	....	5.86	
The American Cereal Co.'s Quaker Oat Feed.	7	Highest	11.69	....	4.30	
		Lowest	7.75	12.03	3.04	3.49
		Average	9.83	....	3.66	
W. H. Haskell & Co.'s Haskell's Oat Feed.	1	....	9.50	9.62	6.51	7.66
Andrew Cullen's Crescent Oat Feed.	1	....	7.81	10.90	2.99	3.70
Northwestern Fertilizer Co.'s HorseShoeBrand Ground Beef Crackings for Poultry.	2	Highest	66.44	....	19.61	
		Lowest	64.63	60.00	16.95	16.00
		Average	65.54	....	18.28	
Bradley Fertilizer Co.'s Bradley's Superior Meat Meal	2	Highest	53.94	....	9.48	
		Lowest	52.25	40.00	9.40	15.00
		Average	53.10	....	9.44	
Bowker Fertilizer Co.'s Bowker's Pure Beef Scraps.	1	....	51.88	....	14.89	
Bowker Fertilizer Co.'s Bowker's Animal Meal.	3	Highest	46.94	....	12.45	
		Lowest	39.69	30 00	10.69	5.00
		Average	42.92	....	11.45	
B. Randall's Pure Beef Scraps.	1	....	47.44	....	23.08	
American Fertilizer Co.'s American Poultry Meal.	1	....	38.06	....	22.44	

[Blank for forwarding samples of feeding stuffs for free analysis.]

....................189....

(Do not write here.)

Station No.......... Chas. D. Woods, Director

Received............ Agricultural Experiment Station,

Orono, Maine.

SIR: I send you to-day, by mail, a fair sample of a feeding stuff. In addition to the red tax tag each package carried the following statements.

(In case these statements are on a tag, it can be sent instead of a copy of the statement.)

Name of goods ....

Name of Manufacturer ....

Per cent. protein............... Per cent. fat...............

The sample was taken by me in accordance with the directions on the back of this sheet, and fairly represents the stock from which it was drawn.

Signature,..................................

Post Office address,..........................

Witness:* The above-described sample was taken in my presence.

Signature of Witness,..........................

Name of Dealer,..............................

Address, ...

---

* The witness should be the dealer or his representative, a postmaster, or town or city officer.

FREE ANALYSIS OF FEEDING STUFFS.

The Station officers take pains to obtain for analysis samples of all feeding stuffs coming under the law, but the co-operation of consumers is essential for the full and timely protection of their interests. Whenever anyone believes that this law is being evaded in any way, he is requested to notify the Director of the Station.

The Station will promptly analyze samples of feeding stuffs taken in accordance with the following directions and report the results to the interested parties. Dealers and consumers are urged to avail themselves of this offer.

DIRECTIONS FOR SAMPLING.

The sample should fairly represent the feeding stuff and is best obtained as follows:

Open one or more full and unbroken packages, and mix well together the contents of each for a foot in depth, take out three cupfuls from different parts of the mixed portions of each package, pour them one over another upon a paper, intermix thoroughly and fill a tin spice or baking powder box from the mixture. Detach this leaf, fill out the blank on the opposite side, securely wrap the box and blank in paper and send by mail to the

Agricultural Experiment Station,
Orono, Maine.

THE SPRAYING OF PLANTS.

W. M. Munson.

LET US SPRAY.

"It is conservatively estimated that the annual yield of all crops is lessened about 25 per cent. by the attacks of injurious insects and fungous diseases. Experiments have demonstrated that at least 75 per cent. of this loss can be prevented by the use of simple remedies applied by means of a spray pump. Expressed in figures, the annual loss would represent about $500,000,000 in the United States alone. Of this amount, 75 per cent., or $375,000,000 can be saved by spraying."*

The above paragraph represents the facts concerning the importance of spraying, at the present time. Previous reports † have detailed the experiments made along this line at this Station, and equally striking results have been obtained at other stations. Spraying has ceased to be an experiment. The beneficial results obtained at the experiment stations have been fully corroborated in practical field work, and now it is important to know the *how* and the *why* of spraying. In other words, in order that the best results may be obtained, spraying must be done intelligently.

Success in spraying, as in most of the work in life, is largely a matter of detail. Little things, seemingly unimportant, all affect the results obtained. Failure may usually be attributed to lateness of application, carelessness in applying or in preparing the material, or to defective apparatus.

WHY SPRAY?

Spraying is plant insurance. It is, with few exceptions, a *preventive* measure for many of the ills that plants are heir to, and *not* a cure. There are several distinct classes of enemies that must be met, each in a different way. These enemies may be grouped first under the two general heads,—insects and fungi.

---

* Weed, Spraying for Profit, p. 9.

† Rep. Maine Expt. Sta., 1891, p. 99; 1892, p. 92; 1893, p. 124.

The insect enemies are naturally divided into distinct classes which must be met in very different ways, and the same is true of the fungi. The first class of insect enemies includes those that, either in the mature form or as larvæ, eat the plant tissue; e. g., the plum curculio, the codling moth, the currant worm, the tent-caterpillar, the potato beetle, etc. These are very readily destroyed by the application of some form of arsenic, as Paris green, to the parts which will be eaten.

Another class of insects, e. g., the plant lice and some of the scale insects, obtain their food by sucking the juices of the plant and, therefore, are not affected by an application of poison. These must be overcome by an external irritant, such as kerosene, or an alkali like caustic soda or strong soap suds, or by some material that will close the breathing pores and thus stop respiration, e. g., pyrethrum or hellebore (in the dry form hellebore acts in both ways.)

Fungi (singular, *fungus*) are simply low forms of plant life which feed upon organic matter, either living or dead. Those which grow on living tissues—*parasitic fungi*—are the ones with which we are specially concerned. It is these which cause many of the blights and rusts, and smuts and scabs and mildews of various plants. Fungi are propagated by means of minute, microscopic bodies, called spores, which are carried from place to place by the wind and by insects, birds and other animals. A spore, falling upon the surface of a leaf, or the growing tip of a branch, if in the presence of moisture and the usual summer temperature, germinates in a manner very similar to that of a seed. If the surface of the leaf or fruit is coated with some material which is destructive to the young fungus, as the spore germinates, all the damage from the parasite is warded off. If, on the other hand, there is even a small spot that is not coated, there is opportunity for the parasite to obtain a foothold. With few exceptions, after the parasite has once attacked the plant, spraying is of little if any avail.

WHEN TO SPRAY.

The time of spraying will depend upon the purpose in view, but in *no case* should spraying be done when the plants are in full bloom. Spraying at this time will often interfere with the fertilization of the flowers, and consequently reduce the crop of fruit, while there is much needless destruction of bees and other insects which work upon the flowers.

In general, spray *early*. "Delays are dangerous." Fruit trees should be sprayed before the buds open, potatoes before disease or insects appear. Subsequent treatment will depend very largely upon the nature of the season; if very wet, it may be necessary to spray every two or three weeks; if relatively dry, three or four treatments may be sufficient.*

HOW TO SPRAY.

Insecticides and fungicides are more effective if applied in a liquid rather than in a dry form, since they adhere to the foliage better. *Sprinkling is not spraying.* The best results are obtained from the use of a fine spray or mist forcibly applied to the foliage; and so far as possible, it should reach the under sides of the leaves. A fine mist is preferable to a coarse spray, as there is much less waste of material and much less danger of injury to the foliage. A single dash of the mist is better than continued soaking, as in the latter case the material gathers in drops and runs off or injures the foliage.

As already stated, spraying for fungi is a preventive measure rather than a cure. If the surface of the leaf is not completely covered on both sides, with the protective coating, there is still danger of attack. The spores of the fungus may fall upon the smallest unprotected spot.

Again, while young insects may be killed by a very small dose of poison, a much larger amount will be required as they grow older. So spraying should be commenced early, that the first meal of a young insect may be his last, and in order to insure this end, the poison must be finely divided and evenly distributed.

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* The Station has prepared specific directions for spraying; (1) Apples and other fruit trees; (2) potatoes. These will be sent free to any address upon application.

THE MATERIALS FOR SPRAYING.

The materials used in spraying are mainly of two general kinds, fungicides used in killing fungi, and insecticides, used in killing insects. The principal fungicides are Bordeaux mixture and sulphide of potassium. The more important insecticides are arsenic, in some form (usually Paris green), kerosene and tobacco.

*Bordeaux Mixture.** This is the fungicide *par excellence* for general use, and its preparation is a matter of considerable importance. The formula in general use at present is known as the "4, 4, 40" formula. In other words the mixture consists of 4 lbs. copper sulphate, 4 lbs. fresh lime and 40 gallons of water. The copper sulphate should be dissolved in three or four gallons of water in a wooden or earthen vessel and the lime (which must be absolutely fresh) should be slaked in a separate vessel, and diluted with water till it is of a milky nature. When ready for use, the two solutions may be mixed in a third vessel, care being taken to stir constantly during the process. In every case, the mixture should be passed through a sieve of number 50 brass wire cloth, or through cheese cloth backed by common window screen wire. This straining is necessary to prevent clogging of the nozzle.

Potassium Sulphide. Potassium sulphide, or "liver of sulphur" is specially valuable as a preventive of gooseberry mildew and for use in the greenhouse. In using this material four ounces of the sulphide are dissolved in ten gallons of water.

Paris Green. This material is the one which is always reliable for the destruction of leaf-eating insects. Many other forms of arsenic have been recommended, but none have proved so generally satisfactory as Paris green.† It is practically insoluble in water, but as there is usually present a small amount of soluble arsenic, it is always well to add a little fresh lime to the mixture before applying, that injury to the foliage may be averted. Paris green is generally mixed with water in the proportion of 1 pound to 200 gallons. If lime is added, however, a pound to 100 gallons may be used.

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*More specific directions for the preparation of Bordeaux mixture will be found in the special directions for spraying, already referred to. While the use of freshly prepared Bordeaux is to be preferred, there are "prepared" Bordeaux mixtures that are used by some who doubt their ability to make the mixture. These prepared mixtures may be obtained from most dealers in spraying apparatus. The two brands which have come to the notice of the writer are the "Lenox" made by the Lenox Sprayer Company, Pittsfield, Mass., and the "Lion," made by James A. Blanchard, New York City.

† Among the cheaper substitutes for Paris green are "Green Arsenite," "Paragrene," "Emerald Green," "Arsenite of Soda," "Arsenate of Lead," etc. With the exception of the last named, which is largely used by the Gypsy Moth Commission of Massachusetts, the substitutes are still to be considered as experimental.

Kerosene. Kerosene is the specific for all sucking insects. It kills by contact and, owing to its cheapness and efficiency, will probably remain the most valuable insecticide for this class of insects. The form in which it is usually applied is the soap emulsion,* but there are now several forms of spray pumps which make a mechanical mixture of kerosene and water, thus greatly reducing the labor.

Tobacco. A strong decoction of tobacco ("tobacco tea") is often used with success in destroying the lice upon rose bushes and tender, soft-wooded plants.

WHAT APPARATUS IS NECESSARY?

In order that the best results may be obtained, suitable apparatus is needed. Such apparatus consists of a good force-pump, with one or two lines of discharge hose, nozzles, a barrel or tank for holding the mixture and a wagon for carrying all.

The Pump. The pump should be large enough to supply two lines of discharge pipe, so that one man may pump while two others distribute the spray. The small bucket and knapsack pumps do very well for a limited amount of spraying, but in field work, toys will not answer. All parts of the pump that are subject to wear should be of brass and should be carefully adjusted.

The Hose. Two pieces of one-half inch hose, of sufficient length to give freedom to the operator are needed. About fifteen feet is the length usually preferred.

The Nozzle. The nozzle is one of the most important parts of the spraying apparatus. It should throw a fine mist-like spray, and should be easily cleaned. The one in most common use is, perhaps, the Vermorel. The McGowen is one of the best for tall trees.

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* One-half pound hard soap, 1 gallon boiling water, 2 gallons kerosene. Dissolve the soap in the water, add the kerosene and churn through a force pump for ten minutes. For use, dilute ten to twenty times with water.

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The Barrel. A kerosene barrel holding about fifty gallons, or a hogshead holding 100 gallons is the best tank. It can be placed upon the side or stood on end, and a small opening made in which to place the pump and to stir the liquid.

The Wagon. Any low wagon with wide tires is suitable. For convenience in turning, a two-wheeled cart is to be preferred.

WHERE MAY APPARATUS BE OBTAINED?

Pumps and nozzles are made by many reliable firms and may be obtained at comparatively low cost by ordering directly from the manufacturers. With so many good pumps on the market, it is not easy to state which is the best.

Of the prominent manufacturers of spraying apparatus, the following is a partial list: Morrill & Morley, Benton Harbor, Mich.; The Field Force Pump Company, Lockport, N. Y.; The Goulds Mfg. Co., Seneca Falls, N. Y.; The Deming Company, Salem, O. (Chas. J. Jager & Co., No. 174 High St., Boston, New England Agents); The Lenox Sprayer Co., Pittsfield, Mass.; F. E. Myers & Bro., Ashland, Ohio; W. & B. Douglass, Middletown, Conn.; The P. C. Lewis Company, Catskill, N. Y.; William Stahl, Quincy, Ill.; The Aspinwall Mfg. Co., Jackson, Mich. All these firms are reliable and will send catalogues on application.

The manufacturers of apparatus were requested to send to the Experiment Station a list of their agents in Maine. The following names were returned: Kendall & Whitney, Portland; C. M. Conant & Co., Bangor; R. B. Dunning & Co., Bangor; A. L. & E. F. Goss Co., Lewiston; George B. Haskell & Co., Lewiston; O. F. Frost, Monmouth; J. C. Crosby, Cranberry Isle; F. A. Hussey, Topsham; G. A. Perkins, Auburn; F. L. Howe, Fairfield; L. H. Strout, Kent's Hill; G. J. Riney, Gardiner.

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SIXTEENTH ANNUAL REPORT

OF THE

Maine Agricultural Experiment Station

ORONO, MAINE,

1900.

PART II OF THE ANNUAL REPORT OF THE UNIVERSITY OF MAINE

EXPERIMENT STATION OFFICE.

SIXTEENTH ANNUAL REPORT

OF THE

Maine Agricultural Experiment Station

ORONO, MAINE,

1900.

AUGUSTA
KENNEBEC JOURNAL PRINT
1901

The Bulletins of this Station will be sent free to any address in Maine. All requests should be sent to

Agricultural Experiment Station,
Orono, Maine.

STATE OF MAINE.

A. W. Harris, Sc. D., President of the University of Maine:

SIR:—I transmit herewith the Fifteenth Annual Report of the Maine Agricultural Experiment Station for the year ending December 31, 1900.

CHARLES D. WOODS,
Director.

ORONO, Maine, December 31, 1900.

MAINE

AGRICULTURAL EXPERIMENT STATION

ORONO, MAINE.

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ANNOUNCEMENTS.

THE AIM OF THE STATION.

Every citizen of Maine concerned in Agriculture, has the right to apply to the Station for any assistance that comes within its province. It is the wish of the Trustees and Station Council that the Station be as widely useful as its resources will permit.

In addition to its work of investigation, the Station is prepared to make chemical analyses of fertilizers, feeding stuffs, dairy products and other agricultural materials; to test seeds and creamery glass-ware; to identify grasses, weeds, injurious fungi and insects, etc.; and to give information on agricultural matters of interest and advantage to the citizens of the State.

All work proper to the Experiment Station and of public benefit will be done without charge. Work for the private use of individuals is charged for at the actual cost to the Station. The Station offers to do this work only as a matter of accommodation. Under no condition will the Station undertake analyses, the results of which cannot be published, if they prove of general interest.

INSPECTIONS.

The execution of the laws regulating the sale of commercial fertilizers, concentrated commercial feeding stuffs, and agricultural seeds, and the inspection of chemical glass-ware used by creameries is entrusted to the Director of the Station. The Station officers take pains to obtain for analysis samples of all brands of fertilizers and feeding stuffs coming under the law, but the organized co-operation of farmers is essential for the full and timely protection of their interests. Granges, Farmers Clubs and other organizations can render efficient aid by report-ing any attempt at evasion of the laws and by sending, early in the season, samples taken from stock *in the market* and drawn in accordance with the Station directions for sampling. In case there should be a number of samples of the same brand sent in, the Station reserves the right to analyze only in part.

STATION PUBLICATIONS.

The Station publishes 10 to 12 bulletins each year, covering in detail its expenses, operations, investigations and results. The bulletins are mailed free to all citizens who request them. The annual Report is a reprint of the bulletins of the year and is bound with the Report of the Board of Agriculture and distributed by the Secretary of the Board. This combined report can be obtained by addressing the Secretary of Agriculture, State House, Augusta, Maine.

CORRESPONDENCE.

As far as practicable, letters are answered the day they are received. Letters sent to individual officers are liable to remain unanswered, in case the officer addressed is absent. All communications should, therefore, be addressed to the

Agricultural Experiment Station,
Orono, Maine.

The post office, railroad station, freight, express and telegraph address is Orono, Maine. Visitors to the Station can take the electric cars at Bangor and Old Town.

The telephone call is "Bangor, 27-3."

Directions, forms and labels for taking samples, of fertilizers, feeding stuffs and seeds for analysis can be had on application.

Parcels sent by express should be prepaid, and postage should be enclosed in private letters demanding a reply.

Remittances should be made payable to the undersigned.

CHAS. D. WOODS, *Director.*

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